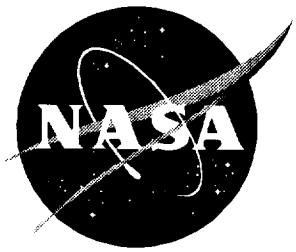
NASA/CR-1998-207663



Aviation System Analysis Capability Quick Response System Report for Fiscal Year 1997

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Prepared for Langley Research Center
under Contract NAS2-14361

April 1998

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SUMMARY

To meet its objective of assisting U.S. industry with the technological challenges of the future, the National Aeronautics and Space Administration (NASA) must identify research areas that have the greatest potential for improving the operation of the air transportation system. Therefore, NASA seeks to develop the ability to evaluate the potential impact of various advanced technologies. By thoroughly understanding the economic impact of advanced aviation technologies, and by evaluating how these new technologies would be used within the integrated aviation system, NASA aims to balance its aeronautical research program and help speed the introduction of high-leverage technologies. To meet these objectives, NASA is building an Aviation System Analysis Capability (ASAC).

NASA envisions the ASAC primarily as a process for understanding and evaluating the impact of advanced aviation technologies on the U.S. economy. ASAC consists of a diverse collection of models, databases, and analysts and other individuals from the public and private sectors brought together to work on issues of common interest to organizations within the aviation community. ASAC will also be a resource available to those same organizations to perform analyses; provide information; and assist scientists, engineers, analysts, and program managers in their daily work. With the Quick Response System (QRS), a component of the ASAC, ASAC users can quickly collect and analyze aviation data that are resident in the ASAC data repositories.

This document, the *Aviation System Analysis Capability Quick Response System Report for Fiscal Year 1997*, presents the additions and modifications made to the QRS in FY97 in support of the ASAC QRS development effort. This document builds upon the *Aviation System Analysis Capability (ASAC) Quick Response System (QRS) Test Report*[1] that documented the baseline for the QRS.

The first section of this document is the document summary.

The second section of this document, Introduction, contains an overview of the project background and scope, and the design components of the QRS.

The third section, ASAC QRS, defines the QRS and presents this year's additions made to the QRS.

[1] NASA Contractor Report #201680, April 1997, Eileen Roberts, James A. Villani, and Paul Ritter.

The fourth section, ASAC Facility Description, presents an overview of the Logistics Management Institute (LMI) ASAC facility, including hardware and software, that supports the QRS.

The fifth section, Planned FY98 QRS Additions, includes a summary of the planned additions to the QRS in FY98.

The final section is the document conclusion,

There are five appendixes to this document:

- Appendix A contains the QRS database descriptions.
- Appendix B presents the QRS Model Wizard Web Site Map.
- Appendix C contains a list of all reports available on the QRS Report Server.
- Appendix D lists all problem reports (PRs) that remained after the initial QRS testing plus PRs that were written in FY97.
- Appendix E defines the abbreviations used in this document.

INTRODUCTION

NASA's Role in Promoting Aviation Technology

The United States has long been the world's leader in aviation technology for civil and military aircraft. During the past several decades, U.S. firms have transformed this position of technological leadership into a thriving industry with large domestic and international sales of aircraft and related products.

Despite its historic record of success, the difficult business environment of the recent past has stimulated concerns about whether the U.S. aeronautics industry will maintain its worldwide leadership position. Increased competition, both technological and financial, from European and other non-U.S. aircraft manufacturers has reduced the global market share of U.S. producers of large civil transport aircraft and cut the number of U.S. airframe manufacturers to only two.

The primary role of NASA in supporting civil aviation is to develop technologies that improve the overall performance of the integrated air transportation system, making air travel safer and more efficient, while contributing to the economic welfare of the United States. NASA conducts much of the basic and early applied research that creates the advanced technology introduced into the air transportation system. Through its technology research program, NASA aims to maintain and improve the leadership role in aviation technology and air transportation held by the United States for the past half century.

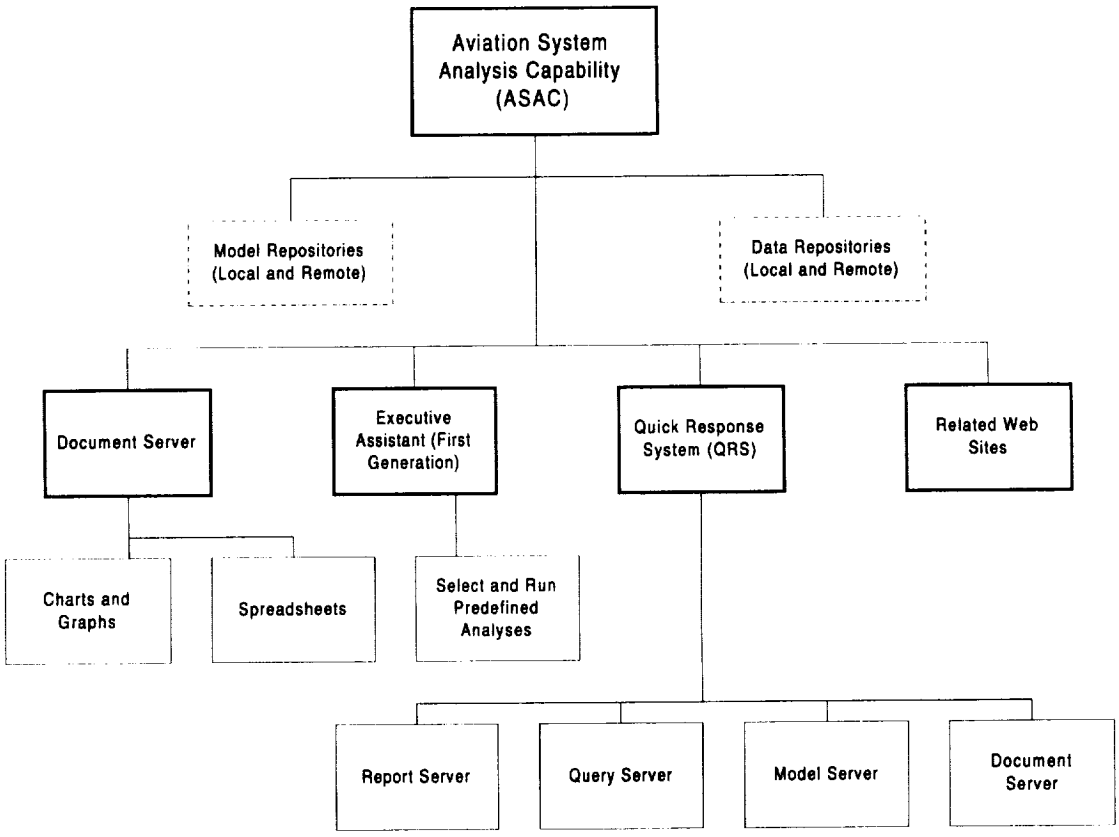
The principal NASA program supporting subsonic transportation is the Advanced Subsonic Technology (AST) program. In cooperation with the Federal Aviation Administration and the U.S. aeronautics industry, the goal of the AST program is to develop high-payoff technologies that support the development of a safe, environmentally acceptable, and highly productive global air transportation system. NASA measures the long-term success of its AST program by how well it contributes to an increased market share for U.S. civil aircraft and aircraft component producers and to the increased effectiveness and capacity of the national air transportation system.

NASA's Research Objective

To meet its objective of assisting the U.S. aviation industry with the technological challenges of the future, NASA must identify research areas that have the greatest potential for improving the operation of the air transportation system. Therefore, NASA seeks to develop the ability to evaluate the potential impact of various advanced technologies. By thoroughly understanding the economic impact of advanced aviation technologies and by evaluating how those new technologies would be used within the integrated aviation system, NASA aims to balance its aeronautical research program and help speed the introduction of high-leverage

technologies. To meet these objectives, NASA is building the ASAC. The components of the ASAC are shown in Figure 1.

Figure 1. ASAC System Components



NASA has tasked LMI to design a prototype of the ASAC QRS. The prototype provides an interface from NASA personnel to selected databases and reports to support NASA goals. In this document, we address the content of the QRS.

ASAC Quick Response System

QRS Description

The QRS is comprised of four system components as reflected in Figure 2.

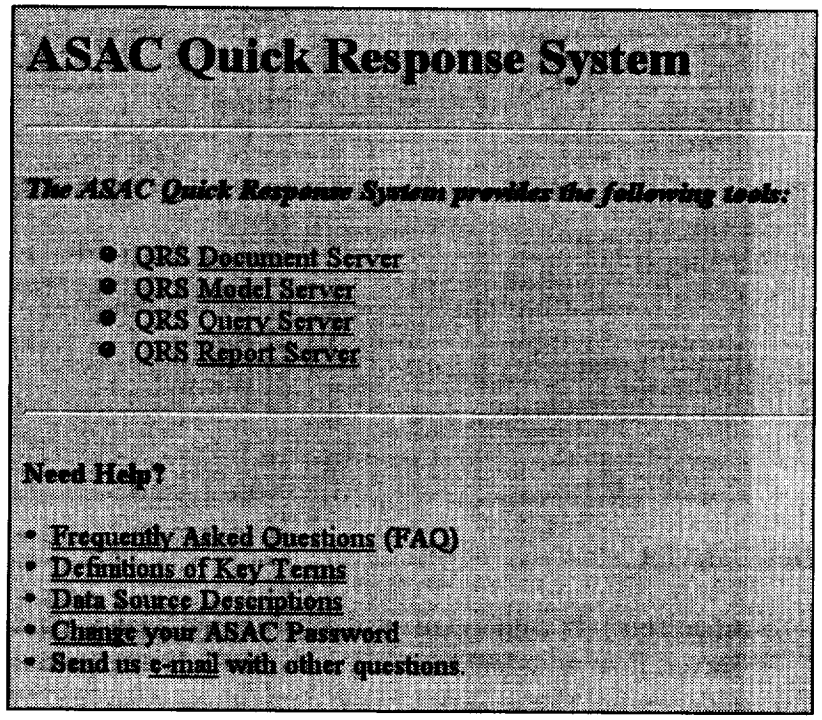
- QRS Document Server
- QRS Model Server
- QRS Query Server
- QRS Report Server.

Authorized users can access the QRS at:

http://www.asac.lmi.org/access/index.html

by using a forms- and JavaScript-capable World Wide Web (WWW) browser such as Netscape Navigator.

Figure 2. ASAC Quick Response System Screen

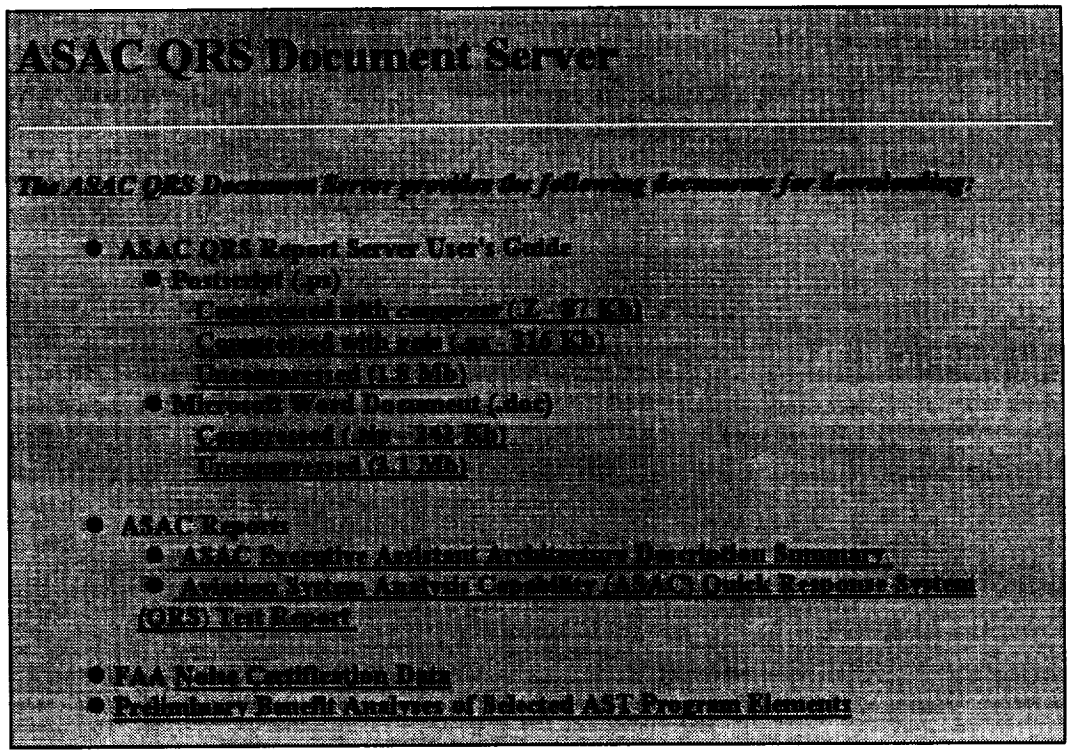


QRS DOCUMENT SERVER

The first component, the QRS Document Server, hosts QRS-related documents such as *ASAC QRS Report Server User's Guide*, LMI Report NS601RD1 as reflected in Figure 3.[2]

[2] Logistics Management Institute, ASAC QRS Report Server User's Guide, Report NS601RD1, Eileen Roberts, James A. Villani, Earl R. Wingrove, October 1996.

Figure 3. ASAC QRS Document Server Screen



QRS MODEL SERVER

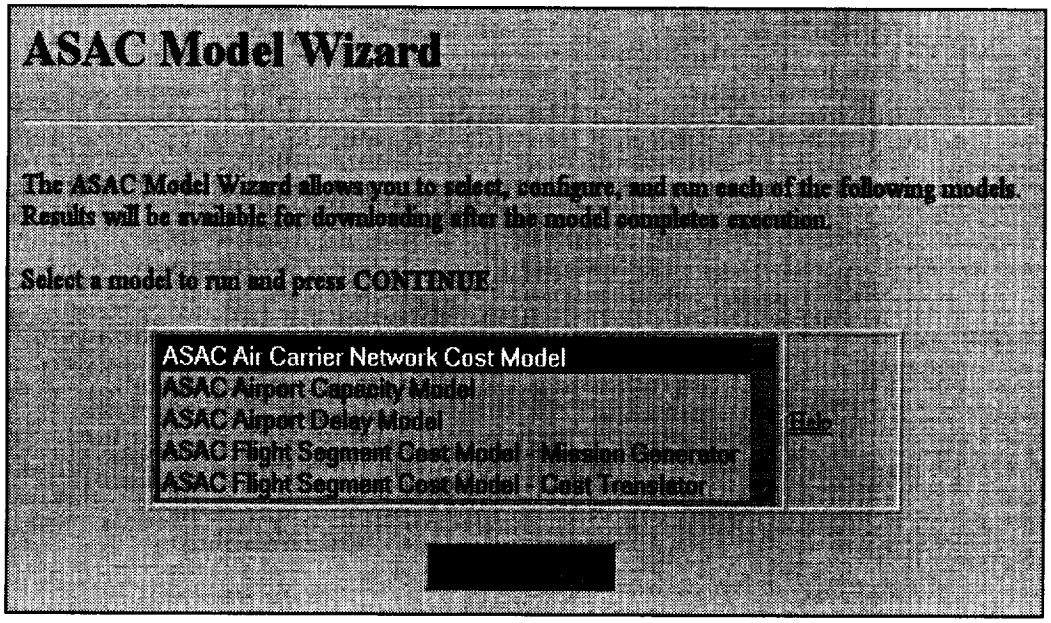
At present, six models are available from the second component, the QRS Model Server. Four additional models were under development in FY97. They will be added to the Model Server in the near future. Also in FY97, the ASAC Air Carrier Investment Model was converted from a stand-alone model to a model available via a WWW interface. The models are listed in Table 1.

Models available via a WWW interface are run in the QRS by using the QRS Model Wizard, which guides users through various screens that are required to provide inputs to the models (see Figure 4). The QRS Model Wizard Web site map, which depicts all QRS Model Wizard screens, can be found in Appendix B.

Table 1. Contents of ASAC Model Repositories

Model	Operating system	Comment
Existing Models		
ASAC Air Carrier Investment Model	Windows and Macintosh (Excel, Version 5.0), will be HP-UX 10.20	Available as a stand-alone model, will be available via a WWW interface
ASAC Air Carrier Network Cost Model	HP-UX 10.20	Available via a WWW interface
ASAC Airport Capacity Model - Detroit	HP-UX 10.20	Available via a WWW interface
ASAC Airport Delay Model - Detroit	HP-UX 10.20	Available via a WWW interface
ASAC Flight Segment Cost Model—Cost Translator	HP-UX 10.20	Available via a WWW interface
ASAC Flight Segment Cost Model—Mission Generator	HP-UX 10.20	Available via a WWW interface
FY97 Models		
Aircraft/ATC Functional Analysis Model	HP-UX 10.20	Available as a stand-alone model
ASAC Airport Capacity Model - Atlanta	HP-UX 10.20	Available via a WWW interface
ASAC Airport Capacity Model - Dallas	HP-UX 10.20	Available via a WWW interface
ASAC Airport Capacity Model - Los Angeles	HP-UX 10.20	Available via a WWW interface
ASAC Airport Delay Model - Atlanta	HP-UX 10.20	Available via a WWW interface
ASAC Airport Delay Model - Dallas	HP-UX 10.20	Available via a WWW interface
ASAC Airport Delay Model - Los Angeles	HP-UX 10.20	Available via a WWW interface
ASAC Integrated Noise Model	Windows NT Server 4.0	Available via a WWW interface

Figure 4. ASAC QRS Model Wizard Screen

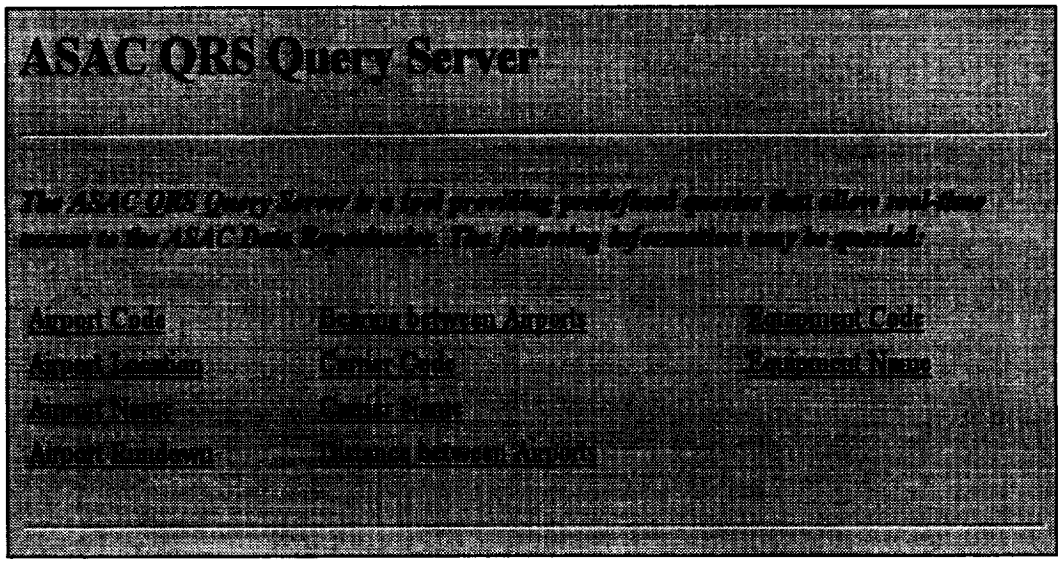


QRS QUERY SERVER

The third component, the QRS Query Server, allows a user to query the following information that is stored in the ASAC data repository (see Figure 5):

- Airport Code
- Airport Location
- Airport Name
- Airport Rundown
- Bearing between Airports
- Carrier Code
- Carrier Name
- Distance between Airports
- Equipment Code
- Equipment Name.

Figure 5. ASAC QRS Query Server Screen

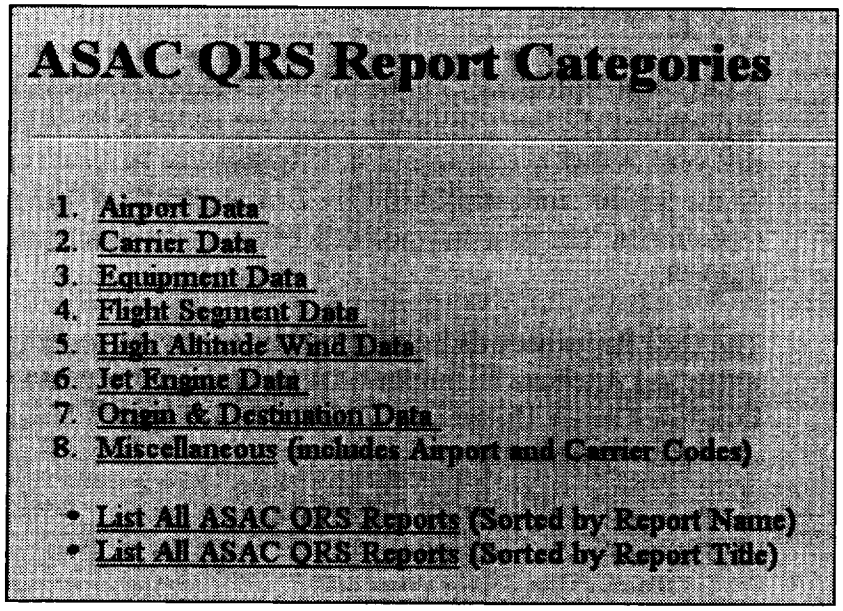


QRS REPORT SERVER

With the fourth component, the QRS Report Server, users can generate reports from information stored in the ASAC data repository. Reports are available from the following eight categories (see Figure 3):

1. Airport Data
2. Carrier Data
3. Equipment Data
4. Flight Segment Data
5. High Altitude Wind Data
6. Jet Engine Data
7. Origin & Destination Data
8. Miscellaneous (includes Airport and Carrier Codes).

Figure 6. ASAC QRS Report Categories Screen



Ninety-five reports are currently available from the QRS Report Server. This includes five reports that were added to the QRS this year so users could access data that was added to the ASAC data repositories (see Table 2).

Additional reports are being constructed to enable users to access Airport Weather Data and U.S. Regional Airline Fleet Data.

Table 2. New QRS Reports

Report name	Report title
HAWD1	High Altitude Wind Data—select by location
HAWD2	High Altitude Wind Data—select by date
RAI-CA1	Regional Aircraft Inventory—carrier aircraft summary (sorted by carrier)
RAI-CA2	Regional Aircraft Inventory—carrier passenger aircraft summary (sorted by model)
RAI-CA3	Regional Aircraft Inventory—cargo aircraft report (sorted by model)

In addition to adding new reports, many existing reports were modified to allow access to new data. For example, 1996 was added to the Inventory Year selection in the Jet Engine Inventory report to accommodate the addition of 1996 World Jet Inventory data. A complete list of QRS reports, and their last revision date, is located in Appendix C.

ASAC Data Repositories

ASAC data repositories support the QRS and its components. New data sources and additional years of existing data were added to the ASAC data repositories this year. A link to data source descriptions can be found on the QRS home page. At the present time, approximately 2.15 gigabytes of data reside in the ASAC data repositories. The data that currently reside in the data repositories are shown in Table 3.

The Data Repository disk configuration, as well as the QRS Database Entity Definition and Attribute Definitions, QRS Database Physical Device Allocation, QRS Database Device Usage, and QRS Database Segment Usage information is included in Appendix A.

Table 3. Content of ASAC Data repositories

Data source	Years of data in repository	Years of data added to the repository this year
Airport Weather	1961–1995	1961–1995
Department of Transportation (DOT) Airline Service Quality Performance (ASQP)	1993 and 1995	–
DOT Form 41 Financial	1989–1995	1995
DOT Origin and Destination Matrices	1989–1995	1995
DOT Schedule B-43 Airframe Inventory	1994–1995	1995
DOT T-100 Flight Segment	1989–1995	1995
DOT T-3/T-100 Airport Rank	1989–1995	1995
Federal Aviation Administration (FAA) Noise Certification	1996	–
FAA Terminal Area Forecast (TAF)	1976–1994 Historical 1995–2010 Forecast	–
High Altitude Wind	1995	1995
U.S. Regional Airline Fleet	1995	1995
World Jet Inventory	1993 and 1995–1996	1996

QRS High-Level Design

The ASAC QRS has two distinct design components:

- QRS Applications, including the following:
  - Graphical User Interface (GUI) in the form of Internet WWW Pages
  - Report Specification Program
  - Report Generation Program
  - Report Viewer for UNIX/X Window Systems.
- ASAC Relational Database Management System (RDBMS).

From a design perspective, the QRS applications support the four system components of the QRS—the Report, Model, Query, and Document Servers, while the ASAC RDBMS is the vehicle for maintaining the ASAC Data Repositories.

The QRS design components are related to QRS components shown in Table 4.

Table 4. QRS Design and System Component Relationships

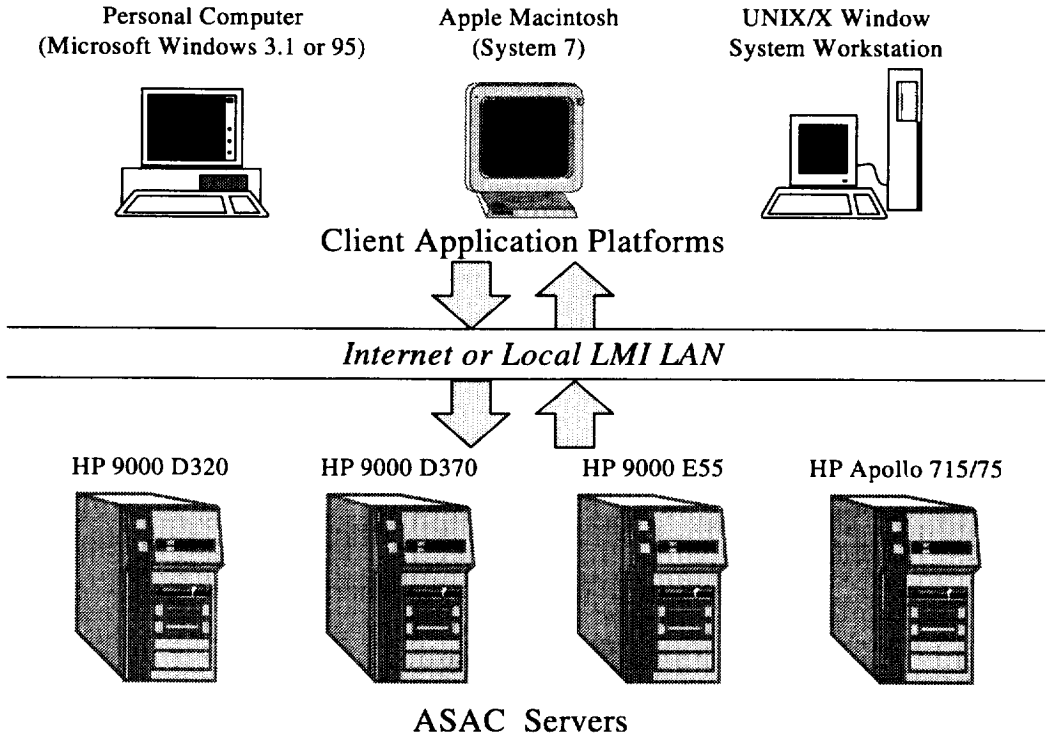
QRS design component	QRS system component
QRS Applications	
GUI	Used by the Report, Model, Query, and Document Servers
Report Specification Program	Used by the Report Server
Report Generation Program	Used by the Report Server
Report Viewer	Used by the Report Server
RDBMS	
Resident Data Repositories	Used by the Report and Query Servers
Models	
Resident Models	Available via the Model Server
Documents	
Resident Documents	Available via the Document Server

The ASAC QRS is implemented with a client-server architecture. The QRS applications reside locally on the client's workstation and on Hewlett-Packard (HP) (UNIX-based) servers located at LMI. The QRS client application runs under the following environments:

- Microsoft Windows 3.1
- Microsoft Windows 95
- Apple Macintosh System 7
- UNIX/X Window Systems
  - HP-UX version 9.0 or above
  - SunOS version 5.4 or above
  - SGI IRIX version 5.3 or above.

The ASAC servers host the ASAC RDBMS and the QRS applications. The user can access the ASAC servers through an Internet connection or LMI Local Area Network (LAN) connection. The high-level QRS hardware configuration is illustrated in Figure 7.

Figure 7. QRS Hardware Configuration



QRS Design Component Overview

QRS APPLICATIONS

Graphical User Interface

The GUI is provided by a commercial WWW browser, such as Netscape Navigator. It is used by the QRS Report, Model, Query, and Document Servers.

QRS Report Specification Program

The Report Specification Program is used by the QRS Report Server. It allows an LMI report author to create a report by specifying the data selection and layout of information contained in the ASAC QRS Database. A report specification contains all of the elements of a report. Report elements include the report title, report filename, Standard Query Language (SQL) statements (to extract data from the database), report column headings, report column definitions, and report totals. The report specifications are stored in the ASAC Report Generation Database. Numerous reports have been created by LMI. These reports are available under the ASAC QRS Query and Report Tool service located on the ASAC WWW site home page. Available reports are listed in Appendix C.

QRS Report Generation Program

The ASAC QRS Report Generation Program is used by the QRS Report Server. It uses a report specification stored in the Report Specification Database, executes the report's SQL statements, and builds a report compatible with either Microsoft Excel or the ASAC QRS Report Viewer for UNIX/X Window Systems.

The Report Generation Program takes a report format previously created by the Report Specification Program and stored in the ASAC Report Specification Database, and either

- runs a query on the ASAC QRS Database based on user parameters entered in a ASAC WWW page and generates a report, or
- retrieves a previously generated report from the ASAC server.

The generated spreadsheet file is in one of two formats:

- .SLK for PC/Windows or Macintosh systems
- .DAT for UNIX systems.

Based on user request, the spreadsheet file will be available to the user by

- e-mail to the user's default or specified e-mail address, or
- posting to the anonymous File Transfer Protocol (FTP) directory for user download.

The user will view the file by using either Excel or the Report Viewer for UNIX/X Window Systems.

QRS Report Viewer for UNIX/X Window Systems

The ASAC Report Viewer for UNIX/X Window Systems is used by the QRS Report Server. It enables the UNIX system user to view (read only) a report from ASAC in a spreadsheet like-manner. It will also allow the user to save the file in a comma-delimited or tab-delimited format so that the file may be imported in to other programs.

RELATIONAL DATABASE MANAGEMENT SYSTEM

The RDBMS product used for ASAC is Sybase System 11. The RDBMS is used by the QRS Report and Query Servers and contains two databases:

- ASAC QRS Database
- ASAC QRS Report Specification Database.

The ASAC QRS Database is a relational database that contains data from the Official Airline Guides (OAG), the U.S. Department of Transportation (DOT), Terminal Area Forecast (TAF), and other sources. The database is accessible to users through the ASAC QRS Report Specification and Generation Programs. The ASAC QRS Database diagram is located in Appendix A.

The ASAC QRS Report Specification Database is a relational database that contains report specifications developed to extract data from the ASAC QRS Database. The database is accessible to users through the ASAC QRS Report Specification and Generation Programs. The QRS Report Specification Database diagram is located in Appendix A.

Database access is limited to the ASAC system administrator, other approved personnel, and the Report Specification and Generation Programs.

MODELS

Models are applications that reside on the QRS and are available from the QRS Model Server as stated in QRS Model Server section.

DOCUMENTS

Documents reside on the QRS and are available from the QRS Document Server as stated in QRS Document Server section.

ADMINISTRATIVE

In addition to the two QRS design components described above, there are QRS administrative functions that allow the system administrator to secure, protect, and maintain the QRS. Administrative functions consist of the following:

- Security
- Logs
- Maintenance, Backup, and Recovery
- Version Control.

Security

Access to the WWW site server is restricted by user ID and password. Access is granted on a directory basis. Passwords are encrypted on the server.

Logs

The following log files are periodically compressed, inspected:

- *Access Log*. Information contained in the Access Log includes the
  - address of the client that requested the document,
  - date and time the transfer took place,
  - Hypertext Transfer Protocol (HTTP) method and protocol used for the transfer,
  - virtual path to the document transferred,
  - status of the transfer, and
  - number of bytes that were transferred.

  The following data can be calculated:
  - Busiest hours of the day, days of the month, etc.
  - Total volume of byte traffic (and percentage of connection bandwidth) for any given time period.
- *Error Log*. The Error Log directive specifies the location of the file that records server errors, including
  - documents that could not be found,
  - timeouts due to slow communications links,
  - connections that have been interrupted,
  - script errors,
  - database errors,
  - invalid configuration files.

Maintenance, Backup, and Recovery

Hardware Maintenance

To keep the ASAC system in optimum condition, hardware maintenance is performed on a manufacturer-recommended schedule. The ASAC server may not be available while server maintenance is being performed.

Software Maintenance

All commercial off-the-shelf (COTS) software products will be protected by a current maintenance agreement with the appropriate software manufacturer. COTS software will be updated or upgraded as required. The COTS software changes should not impact the functionality of the ASAC system.

Backup

Incremental tape backups are performed on the ASAC server three times per week. A full backup of the ASAC Server is performed monthly.

The ASAC server is protected against short-term (less than 30 minutes) power outages by an uninterruptable power supply (UPS). The ASAC server does not contain mission- or life-critical components, therefore no redundancy measures will be taken to ensure continuity in the event of a long-term power outage or equipment malfunction.

Recovery

The ASAC can recover from hardware failures, etc., and the servers can be restored from backup tapes.

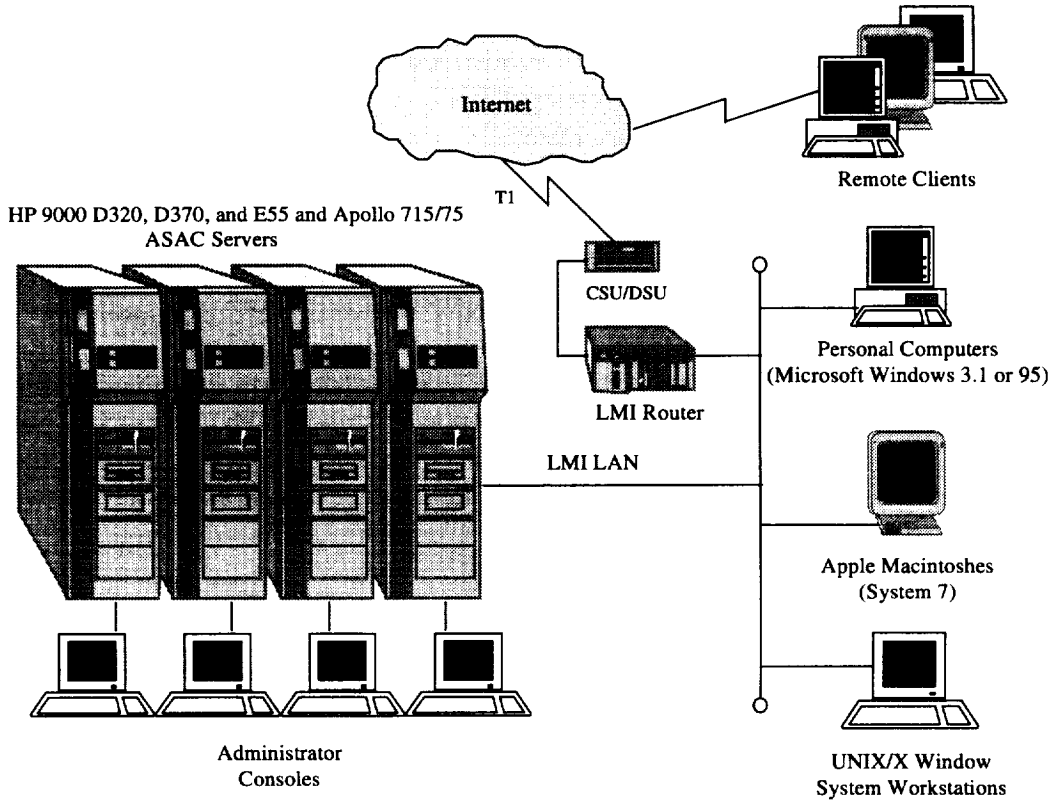
Version Control

All software is under version control. Software is locked and given a version number according to established version control procedures.

ASAC FACILITY DESCRIPTION

The LMI ASAC facility is located at 2000 Corporate Ridge, McLean, Virginia. The facility has been engineered for the development, testing, and operation of ASAC components. The facility contains a LAN that provides interoperability between development and test clients and the ASAC servers. Internet connectivity provides access to the ASAC WWW site from remote clients. The LMI ASAC facility is depicted in Figure 8.

Figure 8. LMI ASAC Facility

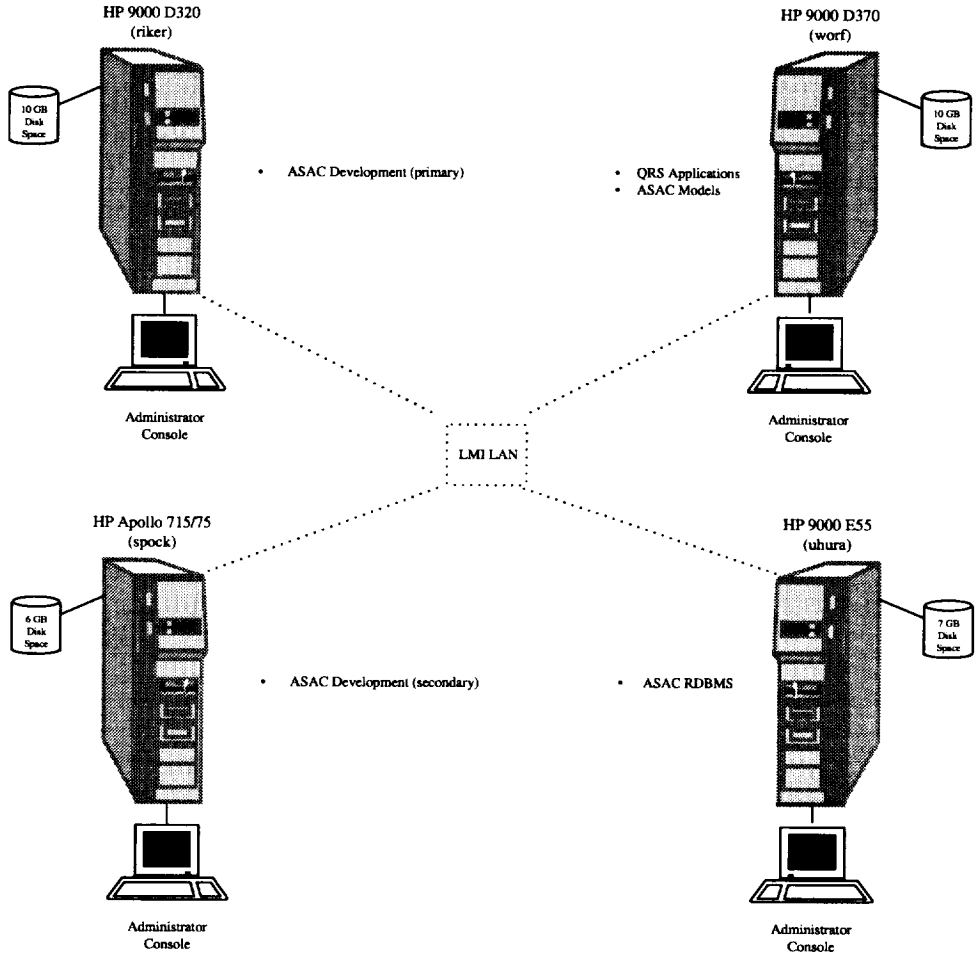


Server Configurations

HP APOLLO 715/75 (SPOCK)

The HP Apollo 715/75 (named spock), depicted in Figure 9, is a UNIX workstation that originally functioned as the ASAC WWW server. The HP Apollo was chosen as the WWW site server because, as a UNIX workstation, it has built-in Transmission Control Protocol/Internet Protocol (TCP/IP) networking capability (the Internet is based on TCP/IP).

Figure 9. ASAC Server Configurations



This year, we moved the ASAC WWW server from spock to a new server, an HP 9000 D370 (named worf). Spock now serves as an ASAC development environment, and it consists of the following components.

Hardware

- HP Apollo 715/75 with
  - 128 megabyte (MB) random access memory (RAM)
  - 75 megahertz Intel 680XX processor
- Four 1 gigabyte (GB) disks
- One 2 GB disk
- Small Computer Systems Interface (SCSI) Adapter (supports up to seven devices)

- Ethernet adapter cables
- One administrator console
- One UPS (with Powerchute software)
- One 2 GB tape backup
- One CD-ROM drive.

Software

- HP/UX version 10.20
- X Window System version 11 release 5 (X11R5)
- Open Software Foundation (OSF) Motif version 1.2
- C compilers
  - cc, c89 (HP/UX ANSI C compiler)
  - CC (HP/UX C++ compiler)
- Pascal compiler
- Sybase System 11 (RDBMS).

HP 9000 E55 (UHURA)

The HP 9000 E55 (named uhura), depicted in Figure 9, is a UNIX workstation that hosts the ASAC RDBMS. It consists of the following components.

Hardware

- HP 9000 E55 with
  - 128 MB RAM
  - 96 megahertz processor
- Seven 1 GB disks
- SCSI Adapter (supports up to seven devices)
- Ethernet adapter cables
- One administrator console

- One UPS
- One 2 GB tape backup
- One CD-ROM drive.

Software

- HP/UX version 10.20
- X Window System version 11 release 5 (X11R5)
- OSF Motif version 1.2
- C compiler
  - cc (HP/UX standard C compiler)
- Sybase System 11 (RDBMS).

HP 9000 D370 (WORF)

The HP 9000 D370 (named worf), depicted in Figure 9, is a UNIX workstation that hosts the QRS applications (WWW site, Report Generation and Specification Programs), as well as the Report Viewer for UNIX/X Window Systems, which is available for download to client platforms. It also hosts the ASAC models. It consists of the following components.

Hardware

- HP 9000 D370 with
  - 128 MB RAM
  - 160 megahertz processor (64-bit PA-8000)
- Five 2 GB disks
- SCSI adapter (supports up to seven devices)
- Ethernet adapter cables
- One administrator console
- One UPS
- One 4 GB tape backup
- One CD-ROM drive.

Software

- HP/UX version 10.20
- X Window System version 11 release 5 (X11R5)
- OSF Motif version 1.2
- C compilers
  - cc, c89 (HP/UX ANSI C compiler)
  - CC (HP/UX C++ compiler)
- Apache HTTP Server version 1.2
- ASAC QRS Report Generation Program
- ASAC QRS Report Specification Program
- Report Viewer for UNIX/X Window Systems.

HP 9000 D320 (RIKER)

The HP 9000 D320 (named riker), also depicted in Figure 9, is a UNIX workstation that functions as the primary ASAC development environment. It consists of the following components.

Hardware

- HP 9000 D320 with
  - 192 MB RAM
  - 132 megahertz processor (PA-RISC 7300LC)
- One 2 GB disk
- Two 4 GB disks
- SCSI adapter (supports up to seven devices)
- Ethernet adapter cables
- One administrator console
- One UPS
- One 4 GB tape backup

- One CD-ROM drive.

Software

- HP/UX version 10.20
- C compilers
  - cc, c89 (HP/UX ANSI C compiler)
  - CC (HP/UX C++ compiler).

Client Configurations

Descriptions of the COTS hardware and the software used for development and test of the QRS are described in the following subsections.

PERSONAL COMPUTER

Personal Computer 1

Hardware

- Compaq Deskpro 486/66I attached to LMI LAN.

Software

- Windows version 3.1
- Novell TCP/IP Transport version 2.4
- Excel version 5.0
- Lotus cc:Mail version 2.21
- Netscape Navigator version 3.0.

Personal Computer 2

Hardware

- Compaq Deskpro XL5120 attached to LMI LAN.

Software

- Windows 95
- Novell TCP/IP Transport version 2.4

- Excel version 7.0
- Lotus cc:Mail version 6.0
- Netscape Navigator version 4.0.

Personal Computer 3 (remote)

Hardware

- Gateway 2000 Pentium 90
- 28000 baud modem

Software

- Windows 95
- Excel version 7.0
- Netscape Navigator version 3.01 Gold.

APPLE MACINTOSH

Macintosh 1

Hardware

- Power Macintosh 7100/66 attached to LMI LAN.

Software

- MacTCP
- Excel version 5.0
- Netscape Navigator version 2.02.

UNIX/X WINDOW

UNIX Workstation 1

Hardware

The following X stations and X terminals are used for development of the ASAC QRS:

- Two ENVIZEX X stations

- Intel i960 Reduced Instruction Set Computer (RISC) processor
- 6 MB memory.

- Four ENTRIA X terminals
  - Intel i960 RISC processor
  - 4 MB memory.

Software

- Software resident on HP servers
- Report Viewer for UNIX/X Window Systems.

UNIX Workstation 2 (remote)

Hardware

- SGI Indy IP22 located at NASA Ames Research Center (hercules.arc.nasa.gov).

Software

- IRIX version 5.3
- Report Viewer for UNIX/X Window Systems

UNIX Workstation 3 (remote)

Hardware

- Sun SPARCStation located at the Pennsylvania State University Center for Electronic Design, Communications, and Computing (cedcc.psu.edu).

Software

- OS version 5.5
- Report Viewer for UNIX/X Window Systems

LAN Configuration

The LAN used to support the ASAC QRS is the internal LMI LAN. LAN hardware and software used by the QRS include the following:

- Kentrox D-SERV Channel Service Unit/Data Service Unit (CSU/DSU)

- T1 leased line Wide Area Network (WAN) backbone
- Cisco IGS Multiprotocol Router/Bridge
  - Network connection—10 Mbps Ethernet capability using 10BaseT twisted pair cabling
  - Leased line Internet feed—high-speed serial ports connect to CSU/DSU
- Multiple network servers hosting the following network operating systems:
  - Novell Netware 4.11
  - Microsoft Windows NT 3.51
  - Microsoft Windows NT 4.0.

Clients have direct access to the ASAC servers by way of the Internet. Clients access the ASAC WWW QRS site by using a browser such as a Netscape Navigator. Reports requested by the client are transmitted to the client over the Internet in the form of an e-mail message or downloaded by the client via FTP. The client views the requested report by using either Excel (for Microsoft Windows and Macintosh System 7 users) or the ASAC Report Viewer for UNIX/X Window Systems (for UNIX users).

Test Tools

All UNIX code developed for the QRS was compiled using Insure++, an automatic runtime compiler, from ParaSoft Corporation. Insure++ automatically detects large classes of programming and runtime errors, algorithmic anomalies, bugs, and deficiencies. Two add-on components, Inuse and Total Coverage Analysis (TCA), were also used. Inuse visualizes in real time the memory manipulation of a program, which aids in discovering bugs and inefficiencies in memory handling. TCA performs coverage analysis of programs, providing necessary feedback about which parts of the code were actually tested.

Insure++ finds a wide variety of programming and memory access errors, including the following:

- Memory corruption due to reading or writing beyond the valid areas of global, local, shared, and dynamically allocated objects.
- Operations on uninitialized, NULL, or "wild" pointers
- Memory leaks

- Errors allocating and freeing dynamic memory
- String manipulation errors
- Operations on pointers to unrelated data blocks
- Invalid pointer operations
- Incompatible variable declarations
- Mismatched variable types in printf and scanf argument lists.

Insure++ also finds library interface errors, including the following:

- Mismatched argument types or function declarations
- Out of range or otherwise invalid arguments in library calls
- Errors returned by library calls.

Inuse, the dynamic memory visualization tool, displays the following:

- Statistics regarding the amount of dynamic memory in use
- Memory fragmentation
- Sizes of allocated blocks
- The number of calls to memory management routines.

TCA, the coverage analysis module, shows the following:

- Which parts of the code were tested
- How much code was tested
- How many times different code blocks were executed.

PLANNED FY98 QRS ADDITIONS

Data

Data will be added to the ASAC QRS Database as follows:

- Add 1996 data for existing ASAC data sources
  - ➤ Airport Weather

- DOT Schedule B-43 Airframe Inventory
- DOT Form 41 Financial
- DOT Origin and Destination Matrices
- DOT T-100 Flight Segment
- DOT T-3/T-100 Airport Rank
- FAA Terminal Area Forecast
- High Altitude Wind
- U.S. Regional Airline Fleet.

Add 1997 data for existing ASAC data sources

- World Jet Inventory.

Add data from new sources

- International Civil Aviation Organization (ICAO) Airport Characteristics
- ICAO Airport Traffic.

Reports

Reports will be updated for data that are added to existing data sources. New reports will be developed for data that are added from new data sources.

Models

New models will be added to the QRS Model Server. Potential models include

- ASAC Air Cargo Investment Model
- ASAC Air Carrier Cost-Benefit Model–prototype
- ASAC Air Carrier Operations Model–prototype
- ASAC Noise Impact Model–upgrade
- System Safety Tolerance Analysis Model (Terminal Area Component)–prototype.

Other

Hardware and software will be upgraded and maintained as required.

CONCLUSION

During the past year, new reports, new data sources, new models, plus additions to existing data sources and reports, were added to the QRS.

Since its initial beta release in December 1995, numerous representatives from NASA, the FAA, universities, and commercial entities have used the QRS to support NASA's research goals.

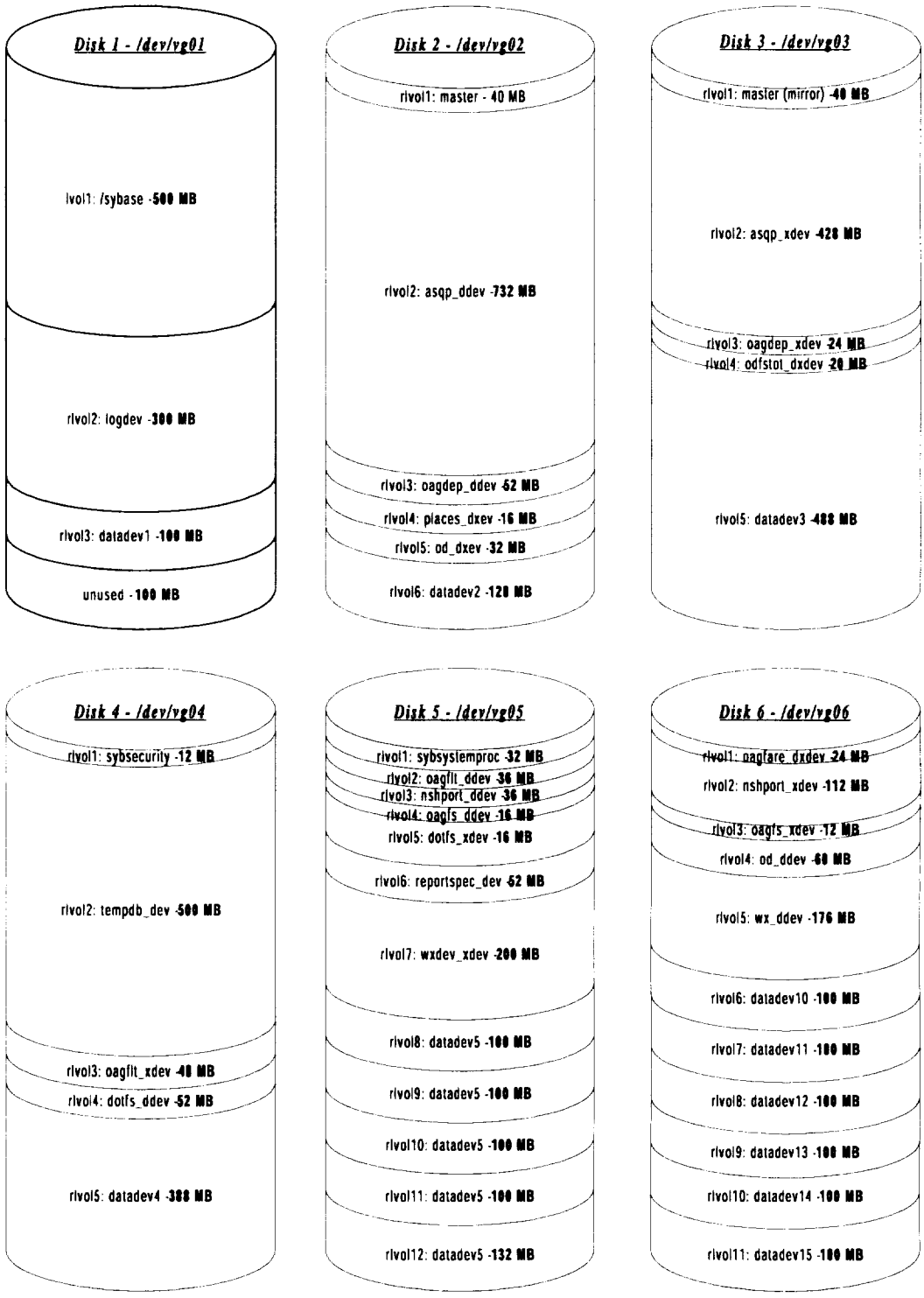
Appendix A
QRS Database Descriptions

This appendix contains the following QRS database information:

- Data Repository Disk Configurations
- QRS Database Entity and Attribute Definitions
- QRS Database Physical Device Allocation
- QRS Database Device Usage
- QRS Database Segment Usage
- QRS Database Entity-Relationship Diagram
- Report Specification Database Entity-Relationship Diagram

DATA REPOSITORY DISK CONFIGURATIONS

Figure A-1. ASAC QRS Database Physical Layout



QRS DATABASE ENTITY AND ATTRIBUTE DEFINITIONS

Table A-1. QRS Database Entity and Attribute Definitions

Entity name	Entity definitions				
AIRCRAFT INVENTORY	Boeing's Year-End World Jet Airplane Inventory				
Attribute Name	*Attribute Definition*	*Required*	*PK*	*FK*	*Domain Name*
sys_oper_num	System Generated Operator ID	Yes	Yes	Yes	Numeric_Id
sys_engine_num	System Generated Engine ID Number	Yes	Yes	Yes	Numeric_Id
craft_inven_cnt	Aircraft Inventory Count	No	No	No	Item_Count
craft_inven_series_nm	Equipment Series Name that defines this model	Yes	Yes	No	Name
dot_model_cd	DOT Equipment Model Code	Yes	Yes	Yes	Equipment_Code
craft_inven_num_eng_type	Aircraft Inventory Number Engines Type (number of engines in free-text form). Exists to relieve ambiguity of DOT_MODEL_CD 999	No	No	No	Num_Engine_Type
craft_inven_yr	Aircraft Inventory Data Year	Yes	Yes	No	Year
AIRCRAFT MODEL TYPE	Aircraft Equipment Model Type (Jet, Propeller, etc.)				
Attribute Name	*Attribute Definition*	*Required*	*PK*	*FK*	*Domain Name*
sys_model_type_num	System Generated Aircraft Model Type Number	Yes	Yes	No	Numeric_Id
model_type_nm	Aircraft Model Type Name	No	No	No	Name
AIRLINE ENTITY	This table lists the airline entity types.				
Attribute Name	*Attribute Definition*	*Required*	*PK*	*FK*	*Domain Name*
entity_dot_cd	Carrier Entity DOT identifier code	Yes	Yes	No	Entity
entity_nm	Carrier Entity name	Yes	No	No	Name
AIRLINE OPERATOR	This table correlates operators that operate airlines with those airlines.				
Attribute Name	*Attribute Definition*	*Required*	*PK*	*FK*	*Domain Name*
airline_oag_cd	OAG Carrier Code	No	No	Yes	Airline_Code
sys_oper_num	System Generated Operator ID	Yes	Yes	Yes	Numeric_Id
airline_dot_cd	DOT Carrier Code	No	No	Yes	Airline_Code
AIRPORT	This table describes individual airports by DOT airport code and airport name. It correlates with the OAG city/airport codes.				
Attribute Name	*Attribute Definition*	*Required*	*PK*	*FK*	*Domain Name*
taf_place_cd	TAF Airport Code	No	No	Yes	TAF_Place_Code
oag_place_cd	OAG Place Code (Airport or City)	No	No	Yes	OAG_Place_Code
sys_port_num	System Generated Airport ID Number	Yes	Yes	No	Numeric_Id
dot_place_cd	DOT Place Code (Airport or City)	No	No	Yes	DOT_Place_Code
AIRPORT CITY	This table correlates OAG city code and airport number.				
Attribute Name	*Attribute Definition*	*Required*	*PK*	*FK*	*Domain Name*
sys_port_num	System Generated Airport ID Number	Yes	Yes	Yes	Numeric_Id

Table A-1. QRS Database Entity and Attribute Definitions (Continued)

Entity name	Entity definitions				
sys_city_num	System Generated City ID Number	Yes	Yes	Yes	Numeric_Id
AIRPORT DISTANCE	This table shows the great circle distance between airports.				
Attribute Name	*Attribute Definition*	*Required*	*PK*	*FK*	*Domain Name*
dist_dest_port_cd	DOT Place Code (Airport or City)	Yes	Yes	Yes	DOT_Place_Code
dist_distance	Great circle distance in statute miles between the two airports	Yes	No	No	Distance
dist_orig_port_cd	DOT Place Code (Airport or City)	Yes	Yes	Yes	DOT_Place_Code
AIRPORT RANK	This table describes the airport rank data for individual airports.				
Attribute Name	*Attribute Definition*	*Required*	*PK*	*FK*	*Domain Name*
rank_dom_onboard_pass	T-100 domestic US onboard passengers	No	No	No	Number
rank_all_sched_depart	T-3 total scheduled departures	No	No	No	Number
rank_dom_enplaned_pass	T-100 domestic US enplaned passengers	No	No	No	Number
rank_dom_sched_depart	T-100 domestic US scheduled departures	No	No	No	Number
rank_all_sched_enplaned_pass	T-3 total scheduled enplaned passengers	No	No	No	Number
rank_dom_rev_pass_miles	T-100 Domestic U.S. Revenue passenger miles (in 1000s)	No	No	No	Item_Count
rank_port_rank_num	Airport Rank Number	Yes	No	No	Number
rank_dom_avail_seat_miles	T-100 Domestic U.S. Available seat miles (in 1000s)	No	No	No	Item_Count
rank_data_yr	Year for which data was taken	Yes	Yes	No	Number
dot_place_cd	DOT Place Code (Airport or City)	Yes	Yes	Yes	DOT_Place_Code
rank_dom_aircraft_miles	T-100 domestic US aircraft miles	No	No	No	Number
ALTITUDE PRESSURE	Relates an air pressure value to an altitude.				
Attribute Name	*Attribute Definition*	*Required*	*PK*	*FK*	*Domain Name*
altitude	altitude (in feet) relative to air pressure	Yes	No	No	Altitude
pressure	air pressure value in millibars	Yes	Yes	No	Millibar
ASQP AIRPORT TOTAL	This table contains rolled-up airport data for ASQP-reportable flights. This data has been extracted from the ASQP_FLIGHT_SCHEDULE table.				
Attribute Name	*Attribute Definition*	*Required*	*PK*	*FK*	*Domain Name*
port_total_data_yr	ASQP Data Totals - data year	Yes	Yes	No	Year
port_total_arrive_cnt	ASQP Data Totals - airport arrivals	No	No	No	Item_Count
port_total_delay_arrive_sum	ASQP Data Totals - sum of arrival delays	No	No	No	Item_Count
port_total_depart_cnt	ASQP Data Totals - total departures	No	No	No	Item_Count
port_total_port_cd	DOT Place Code (Airport or City)	Yes	Yes	Yes	DOT_Place_Code
port_total_taxi_out_sum	ASQP Data Totals - sum of taxi-out times	No	No	No	Item_Count
port_total_delay_depart_sum	ASQP Data Totals - sum of departure delays	No	No	No	Item_Count
port_total_taxi_in_sum	ASQP Data Totals - sum of taxi-in times	No	No	No	Item_Count

Table A-1. QRS Database Entity and Attribute Definitions (Continued)

Entity name	Entity definitions				
ASQP FLIGHT SCHEDULE	This table describes the schedule and delay data for ASQP-reportable flights.				
Attribute Name	*Attribute Definition*	*Required*	*PK*	*FK*	*Domain Name*
asqp_taxi_in_min	Amount of time (in minutes) spent in moving from the landing runway to the arrival gate	No	No	No	Elapsed_Time
asqp_crs_sched_depart_tm	CRS Scheduled Flight Departure Time	No	No	No	Time
asqp_delay_depart_min	Departure Delay (in minutes)	No	No	No	Elapsed_Time
asqp_depart_dt	Flight departure date	Yes	Yes	No	Date
asqp_oag_sched_arrive_tm	OAG Scheduled Flight Arrival Time (should be the same as OAG flight data, but may differ because of different source)	No	No	No	Time
asqp_oag_sched_depart_tm	OAG Scheduled Flight Departure Time (should be the same as OAG flight data, but may differ because of different source)	No	No	No	Time
asqp_tail_num_id	Tail Number identifier of aircraft	No	No	No	Short_Name
asqp_taxi_out_min	Amount of time (in minutes) spent in moving from the departure gate to the takeoff runway	No	No	No	Elapsed_Time
asqp_delay_flight_min	Flight Time Delay (in minutes)	No	No	No	Elapsed_Time
asqp_crs_sched_elapse_min	CRS Scheduled Elapsed Flight Time (in minutes)	No	No	No	Elapsed_Time
asqp_orig_port_cd	DOT Place Code (Airport or City)	Yes	Yes	Yes	DOT_Place_Code
asqp_crs_sched_arrive_tm	CRS Scheduled Flight Arrival Time	No	No	No	Time
asqp_airborne_min	Time (in minutes) that flight is airborne	No	No	No	Elapsed_Time
asqp_act_elapse_min	Actual Elapsed Flight Time (in minutes)	No	No	No	Elapsed_Time
asqp_act_depart_tm	Actual Flight Departure Time	No	No	No	Time
asqp_act_arrive_tm	Actual Flight Arrival Time	No	No	No	Time
asqp_dest_port_cd	DOT Place Code (Airport or City)	Yes	Yes	Yes	DOT_Place_Code
flt_oag_num	OAG Flight Number	Yes	Yes	No	Flight_Number
asqp_wheels_off_tm	Local time when aircraft left the runway during takeoff	No	No	No	Time
airline_dot_cd	DOT Carrier Code	Yes	Yes	Yes	Airline_Code
asqp_wheels_on_tm	Local time when aircraft touched the runway during landing	No	No	No	Time
asqp_delay_arrive_min	Arrival Delay (in minutes)	No	No	No	Elapsed_Time
ASQP FLIGHT SEGMENT	This table contains rolled-up (derived) data from the ASQP_FLIGHT_SCHEDULE table.				
Attribute Name	*Attribute Definition*	*Required*	*PK*	*FK*	*Domain Name*
seg_total_flight_cnt	ASQP Flight Segment Data Totals - total flight count	No	No	No	Long_Item_Count
seg_total_data_yr	ASQP Flight Segment Data Totals - data year	Yes	Yes	No	Year
seg_total_orig_port_cd	DOT Place Code (Airport or City)	Yes	Yes	Yes	DOT_Place_Code
seg_total_delay_flight_sum	ASQP Flight Segment Data Totals - sum of flight delays	No	No	No	Elapsed_Time
seg_total_act_elapse_sum	ASQP Flight Segment Data Totals - sum of actual flight block times	No	No	No	Elapsed_Time
seg_total_dest_port_cd	DOT Place Code (Airport or City)	Yes	Yes	Yes	DOT_Place_Code

Table A-1. QRS Database Entity and Attribute Definitions (Continued)

Entity name	Entity definitions				
B43 INVENTORY	B43 Aircraft Inventory				
Attribute Name	*Attribute Definition*	*Required*	*PK*	*FK*	*Domain Name*
b43_owner_type	Ownership type - relationship of owning airline to aircraft. CL - Capital Lease OL - Operating Lease OW - Owned Aircraft UN - Unknown	Yes	Yes	No	Ownership_Type_Code
b43_seat_cnt	Number of seats on aircraft	No	No	No	Item_Count
airline_dot_cd	DOT Carrier Code	No	No	Yes	Airline_Code
b43_first_del_yr	Year Aircraft was first delivered	No	No	No	Year
b43_serial_num_id	Serial Number of Aircraft	Yes	Yes	No	Short_Name
b43_tail_num_id	Tail number of aircraft	No	No	No	Short_Name
dot_model_cd	DOT Equipment Model Code	Yes	Yes	Yes	Equipment_Code
b43_noise_cat_num	Noise Category (Stage) number	No	No	No	Noise_Category
b43_data_yr	Year of B43 Inventory Data	Yes	Yes	No	Year
BALANCE SHEET	This table describes the balance sheet for an airline.				
Attribute Name	*Attribute Definition*	*Required*	*PK*	*FK*	*Domain Name*
bal_def_credits	Deferred credits	No	No	No	Money
bal_data_yr	Balance Sheet Data Year	Yes	Yes	No	Year
airline_dot_cd	DOT Carrier Code	Yes	Yes	Yes	Airline_Code
bal_curr_liabilities	Current liabilities	No	No	No	Money
bal_total_assets	Total assets	No	No	No	Money
bal_oper_prop_equip	Operating property & equipment	No	No	No	Money
bal_curr_assets	Current assets	No	No	No	Money
bal_net_stock_equity	Net stockholders equity	No	No	No	Money
bal_non_curr_liabilities	Non-current liabilities	No	No	No	Money
CALENDAR	Perpetual calendar table. Holds 14 possible calendar permutations.				
Attribute Name	*Attribute Definition*	*Required*	*PK*	*FK*	*Domain Name*
sys_month_num	System Generated Month ID (1=January ... 12=December)	Yes	Yes	Yes	Month_ID
day_oag_cd	OAG Code for day of the week (1=Monday ... 7=Sunday)	Yes	No	Yes	Day_ID
cal_day	Calendar Day	Yes	Yes	No	Day_ID
cal_id_num	Calendar ID Number	Yes	Yes	Yes	Calendar_ID
CALENDAR ID	Assigns calendar IDs based on the day of the week of New Year's Day and if a year is a leap year or not.				
Attribute Name	*Attribute Definition*	*Required*	*PK*	*FK*	*Domain Name*
new_yrs_day_cd	OAG Code for day of the week (1=Monday ... 7=Sunday)	Yes	No	Yes	Day_ID
cal_id_leap_yr	TRUE if type represents a leap year	Yes	No	No	Boolean
cal_id_num	Calendar ID Number	Yes	Yes	No	Calendar_ID
CITY	This table correlates city, state, US region, country, and DOT city code with the OAG city code.				
Attribute Name	*Attribute Definition*	*Required*	*PK*	*FK*	*Domain Name*
oag_place_cd	OAG Place Code (Airport or City)	No	No	Yes	OAG_Place_Code
city_nm	City Name	Yes	No	No	Name
sys_city_num	System Generated City ID Number	Yes	Yes	No	Numeric_Id
city_state_cd	World Area Code for US State or Canadian province that city is in	No	No	Yes	World_Area_Code

Table A-1. QRS Database Entity and Attribute Definitions (Continued)

Entity name	Entity definitions				
dot_place_cd	DOT Place Code (Airport or City)	No	No	Yes	DOT_Place_Code
city_country_cd	World Area Code for country that city is in	Yes	No	Yes	World_Area_Code
CITY DISTANCE	Describes the average distance between airports in listed cities.				
Attribute Name	*Attribute Definition*	*Required*	*PK*	*FK*	*Domain Name*
dist_dest_city_num	System Generated City ID Number	Yes	Yes	Yes	Numeric_Id
dist_orig_city_num	System Generated City ID Number	Yes	Yes	Yes	Numeric_Id
city_distance	Average distance between airports in listed cities	No	No	No	Distance
CODE SHARING AIRLINE	Some airlines share codes for certain ranges of flight numbers. These airlines and the flight number ranges are described in this table.				
Attribute Name	*Attribute Definition*	*Required*	*PK*	*FK*	*Domain Name*
oper_airline_oag_cd	OAG Carrier Code	No	No	Yes	Airline_Code
flt_oag_num_range_start	Start of range of flight numbers that share codes	Yes	Yes	No	Flight_Number
flt_oag_num_range_end	End of range of flight numbers that share codes	Yes	No	No	Flight_Number
listed_airline_oag_cd	OAG Carrier Code	Yes	Yes	Yes	Airline_Code
DAYS	This table relates the names of the days of the week with the identifier used in the OAG to specify when flights are scheduled.				
Attribute Name	*Attribute Definition*	*Required*	*PK*	*FK*	*Domain Name*
day_nm	Name of the day of the week	Yes	No	No	Day_Name
day_oag_cd	OAG Code for day of the week (1=Monday ... 7=Sunday)	Yes	Yes	No	Day_ID
DOT AIRCRAFT MODEL	This table describes individual aircraft models by manufacturer, model number, and series name. The Code is supplied in the DOT Data (Form 41/Database Products).				
Attribute Name	*Attribute Definition*	*Required*	*PK*	*FK*	*Domain Name*
dot_model_nm	DOT Equipment Model Name	Yes	No	No	Name
dot_model_short_nm	DOT Equipment Model Short Name	No	No	No	Short_Name
dot_model_series_nm	DOT Equipment Series Name	No	No	No	Name
dot_model_num_eng_type	DOT Aircraft Model Engine Type (number of engines in free-text form)	No	No	No	Num_Engine_Type
sys_model_type_num	System Generated Aircraft Model Type Number	No	No	Yes	Numeric_Id
sys_manufact_num	System Generated Equipment Manufacturer ID	Yes	No	Yes	Numeric_Id
dot_model_cd	DOT Equipment Model Code	Yes	Yes	No	Equipment_Code
dot_model_mtow	DOT Equipment Maximum take-off weight	No	No	No	Weight
DOT AIRLINE	This table gives the DOT codes for airlines listed in Form 41 Data. These codes may differ from the OAG codes, even for the same airline. This table also contains the airline group number (1,2, or 3) and type (Scheduled or Other).				
Attribute Name	*Attribute Definition*	*Required*	*PK*	*FK*	*Domain Name*
airline_dot_cd	DOT Carrier Code	Yes	Yes	No	Airline_Code
airline_group_num	Carrier Group Number (Group 1, 2, or 3)	Yes	No	No	Airline_Group
airline_type	Airline Type - Scheduled or Other	Yes	No	No	Airline_Type

Table A-1. QRS Database Entity and Attribute Definitions (Continued)

Entity name	Entity definitions				
DOT AIRPORT CITY COUNT	DOT may list an airport as being in more than one city (Dallas and Fort Worth, for example). Several QRS reports require knowing this count, so we keep this table around to speed up the report generation.				
Attribute Name	*Attribute Definition*	*Required*	*PK*	*FK*	*Domain Name*
dot_port_city_cnt	Number of cities in which DOT lists an airport	No	No	No	Item_Count
dot_place_cd	DOT Place Code (Airport or City)	Yes	Yes	Yes	DOT_Place_Code
DOT FLIGHT SEGMENT DATA	This table describes the data for a flight segment between 2 cities for a particular year and month, airline, and aircraft model.				
Attribute Name	*Attribute Definition*	*Required*	*PK*	*FK*	*Domain Name*
seg_data_num_trips	Trips Flown	No	No	No	Item_Count
dot_model_cd	DOT Equipment Model Code	Yes	Yes	Yes	Equipment_Code
seg_data_onboard_pass	Onboard Passengers	No	No	No	Item_Count
airline_dot_cd	DOT Carrier Code	Yes	Yes	Yes	Airline_Code
seg_data_stage_len	Stage Length of Flight	No	No	No	Item_Count
seg_data_revenue_cap	Revenue (passenger and cargo) capacity (in pounds)	No	No	No	Item_Count
seg_data_yr	Flight Segment Data Year	Yes	Yes	No	Year
seg_data_block_min	Block Time (in minutes)	No	No	No	Item_Count
arrive_port_dot_cd	DOT Place Code (Airport or City)	Yes	Yes	Yes	DOT_Place_Code
depart_port_dot_cd	DOT Place Code (Airport or City)	Yes	Yes	Yes	DOT_Place_Code
seg_data_month	System Generated Month ID (1=January ... 12=December)	Yes	Yes	Yes	Month_ID
seg_data_avail_seats	Available Seats	No	No	No	Item_Count
DOT PLACE	This table contains the DOT codes for airports and cities.				
Attribute Name	*Attribute Definition*	*Required*	*PK*	*FK*	*Domain Name*
dot_place_nm	DOT Place Name (Airport or City)	Yes	No	No	Name
dot_place_cd	DOT Place Code (Airport or City)	Yes	Yes	No	DOT_Place_Code
dot_place_lat_sec	Airport Latitude - Seconds part	No	No	No	Second
dot_place_lat_min	Airport Latitude - Minutes part	No	No	No	Minute
dot_place_lat_hemi	Airport Latitude - Hemisphere part	No	No	No	Hemisphere
dot_place_long_sec	Airport Longitude - Seconds part	No	No	No	Second
dot_place_lat_degr	Airport Latitude - Degrees part	No	No	No	Degree
world_area_cd	World Area Code	No	No	Yes	World_Area_Code
dot_place_long_degr	Airport Longitude - Degrees part	No	No	No	Degree
dot_place_long_min	Airport Longitude - Minutes part	No	No	No	Minute
dot_place_long_hemi	Airport Longitude - Hemisphere part	No	No	No	Hemisphere
EMPLOYEE COUNT	This table describes the employee count for airline entities.				
Attribute Name	*Attribute Definition*	*Required*	*PK*	*FK*	*Domain Name*
empct_labor_maint	Maintenance labor	No	No	No	Item_Count
empct_pers_other	Other personnel	No	No	No	Item_Count
empct_pers_train	Trainees and instructors	No	No	No	Item_Count
empct_pers_traffic	Traffic solicitors	No	No	No	Item_Count
entity_dot_cd	Carrier Entity DOT identifier code	Yes	Yes	Yes	Entity
empct_data_yr	Employee Count data year	Yes	Yes	No	Year
empct_ac_ctrl	A/C Control (26.2) (Groups 2 & 3 only)	No	No	No	Item_Count
empct_pers_transport	Transport-related	No	No	No	Item_Count
empct_flt_pers_pilots	Pilots and co-pilots	No	No	No	Item_Count

Table A-1. QRS Database Entity and Attribute Definitions (Continued)

Entity name	Entity definitions				
empct_gen_mgmt	General management	No	No	No	Item_Count
empct_hndl_pass	Passenger handling (26.3) (Groups 2 & 3 only)	No	No	No	Item_Count
empct_pers_stat	Record keepers and statisticians	No	No	No	Item_Count
empct_craft_hndl	Aircraft and handling (26) (Group 1 only)	No	No	No	Item_Count
empct_flt_attendants	Flight Attendants (24.2)	No	No	No	Item_Count
empct_ac_traffic	A/C Traffic (26.1) (Groups 2 & 3 only)	No	No	No	Item_Count
airline_dot_cd	DOT Carrier Code	Yes	Yes	Yes	Airline_Code
empct_flt_oper_other	Other flying operations (24.1)	No	No	No	Item_Count
empct_hndl_cargo	Cargo handling (26.4) (Groups 2 & 3 only)	No	No	No	Item_Count
ENGINE	This table describes aircraft engines by model and manufacturer.				
Attribute Name	*Attribute Definition*	*Required*	*PK*	*FK*	*Domain Name*
sys_engine_num	System Generated Engine ID Number	Yes	Yes	No	Numeric_Id
sys_manufact_num	System Generated Equipment Manufacturer ID	Yes	No	Yes	Numeric_Id
engine_model_nm	Engine Model Name	Yes	No	No	Name
GROUP 1 OPERATING COSTS	Form 41 P-5.1 equipment-specific operating expenses for Group I airlines by entity.				
Attribute Name	*Attribute Definition*	*Required*	*PK*	*FK*	*Domain Name*
grp1_craft_fuel_oil	Aircraft fuel and oil	No	No	No	Money
airline_dot_cd	DOT Carrier Code	Yes	Yes	Yes	Airline_Code
grp1_equip_maint	Flight equipment maintenance	No	No	No	Money
entity_dot_cd	Carrier Entity DOT identifier code	Yes	Yes	Yes	Entity
dot_model_cd	DOT Equipment Model Code	Yes	Yes	Yes	Equipment_Code
grp1_other_oper_not_rent	Other flight operations except rentals	No	No	No	Money
grp1_equip_depr_rent	Flight equipment depreciation and rentals	No	No	No	Money
grp1_data_yr	Group 1 Operating Costs Data Year	Yes	Yes	No	Year
grp1_wages_benefits	Pilots and co-pilots salary/wages plus benefits	No	No	No	Money
GROUP 2 & 3 OPERATING COSTS	Form 41 P-5.2 equipment-specific operating expenses for Group II and III airlines by entity.				
Attribute Name	*Attribute Definition*	*Required*	*PK*	*FK*	*Domain Name*
grp2_depr_eng	Depreciation-engines	No	No	No	Money
grp2_eng_maint_materials	Engine maintenance-materials	No	No	No	Money
grp2_eng_overhaul_def	Engine overhaul deferred	No	No	No	Money
grp2_insurance_purch	Dollar amount of insurance purchased	Yes	No	No	Money
grp2_depr_other	Depreciation-other flight equipment	No	No	No	Money
grp2_eng_maint_labor	Engine maintenance-labor	No	No	No	Money
dot_model_cd	DOT Equipment Model Code	Yes	Yes	Yes	Equipment_Code
grp2_depr_frame	Depreciation-airframes	No	No	No	Money
grp2_eng_worthy_prov	Engine airworthiness provisions	No	No	No	Money
grp2_craft_oil	Aircraft oil	No	No	No	Money
grp2_empl_benefits	Employee benefits and pensions	No	No	No	Money

Table A-1. QRS Database Entity and Attribute Definitions (Continued)

Entity name	Entity definitions				
grp2_appl_maint_burd	Applied maintenance burden-flight equipment	No	No	No	Money
grp2_expd_parts_obs_det	Obsolescence and deterioration, expendable parts	No	No	No	Money
grp2_depr_eng_parts	Depreciation-engine parts	No	No	No	Money
airline_dot_cd	DOT Carrier Code	Yes	Yes	Yes	Airline_Code
grp2_data_yr	Group 2 & 3 Operating Costs Data Year	Yes	Yes	No	Year
grp2_craft_chrgs	Aircraft interchange outside charges	No	No	No	Money
grp2_eng_maint_outside	Engine maintenance-outside repair	No	No	No	Money
entity_dot_cd	Carrier Entity DOT identifier code	Yes	Yes	Yes	Entity
grp2_amort_equip	Amortization-flight equipment capital leases	No	No	No	Money
grp2_payroll_taxes	Payroll taxes	No	No	No	Money
grp2_frame_worthy_prov	Airframe airworthiness provisions	No	No	No	Money
grp2_depr_frame_parts	Depreciation-airframe parts	No	No	No	Money
grp2_craft_rent	Aircraft rentals	No	No	No	Money
grp2_prof_exp	Professional and technical fees and expenses	No	No	No	Money
grp2_frame_maint_labor	Airframe maintenance-labor	No	No	No	Money
grp2_pers_exp	Personnel expenses	No	No	No	Money
grp2_flt_pers_wages	Other flight personnel wages	No	No	No	Money
grp2_other_taxes	Taxes other than payroll	No	No	No	Money
grp2_frame_maint_outside	Airframe maintenance-outside repair	No	No	No	Money
grp2_pilot_wages	Pilots and co-pilots wages	No	No	No	Money
grp2_frame_maint_materials	Airframe maintenance-materials	No	No	No	Money
grp2_other_supp	Other supplies	No	No	No	Money
grp2_frame_overhaul_def	Airframe overhaul deferred	No	No	No	Money
grp2_craft_fuel	Aircraft fuel	No	No	No	Money
grp2_instr_wages	Trainees and instructors	No	No	No	Money
grp2_craft_maint_inter	Aircraft maintenance-interchange charges	No	No	No	Money
grp2_loss_damage	Injuries, loss, and damage	No	No	No	Money
grp2_other_fly_exp	Other flying expenses	No	No	No	Money
HIGH ALTITUDE WIND	Contains high altitude wind data.				
Attribute Name	*Attribute Definition*	*Required*	*PK*	*FK*	*Domain Name*
wind_longitude	Longitude of wind data	Yes	Yes	No	Longitude
wind_date	Date of wind data	Yes	Yes	No	Date
wind_pressure	air pressure value in millibars	Yes	Yes	Yes	Millibar
wind_eastward_comp	Eastward component of wind data	No	No	No	Float
wind_latitude	Latitude of wind data	Yes	Yes	No	Latitude
wind_northward_comp	Northward component of wind data (m/sec)	No	No	No	Float
MANUFACTURER	This table describes airplane and engine manufacturers.				
Attribute Name	*Attribute Definition*	*Required*	*PK*	*FK*	*Domain Name*
manufact_nm	Manufacturer Name	Yes	No	No	Name
sys_manufact_num	System Generated Equipment Manufacturer ID	Yes	Yes	No	Numeric_Id

Table A-1. QRS Database Entity and Attribute Definitions (Continued)

Entity name	Entity definitions				
MONTHS	Month names, numbered sequentially.				
Attribute Name	*Attribute Definition*	*Required*	*PK*	*FK*	*Domain Name*
month_nm	Month Name	Yes	No	No	Month_Name
month_day_cnt	Count of days in the month (February is always 28).	No	No	No	Item_Count
sys_month_num	System Generated Month ID (1=January ... 12=December)	Yes	Yes	No	Month_ID
month_qtr	Quarter in which Month falls 1=Jan,Feb,Mar 2=Apr,May,Jun 3=Jul,Aug,Sep 4=Oct,Nov,Dec	Yes	No	No	Quarter
OAG AIRCRAFT MODEL	This table describes individual aircraft models by manufacturer, model number,and series name. The identifying code is supplied in the Official Airline Guide.				
Attribute Name	*Attribute Definition*	*Required*	*PK*	*FK*	*Domain Name*
oag_model_seat_high_cnt	OAG Aircraft Model high-end seat count	No	No	No	Item_Count
oag_model_cd	OAG Equipment Model Code	Yes	Yes	No	Equipment_Code
sys_manufact_num	System Generated Equipment Manufacturer ID	Yes	No	Yes	Numeric_Id
oag_model_gtow	OAG Aircraft Model Gross Takeoff Weight	No	No	No	Weight
oag_model_num_eng_type	OAG Aircraft Model Engine Type (number of engines in free-text form)	No	No	No	Num_Engine_Type
oag_model_seat_low_cnt	OAG Aircraft Model low-end seat count	No	No	No	Item_Count
sys_model_type_num	System Generated Aircraft Model Type Number	No	No	Yes	Numeric_Id
oag_model_series_nm	OAG Equipment Series Name	No	No	No	Name
oag_model_usage_yrs	An eight-bit bitmap that defines the years that a piece of equipment is being used. The bits from the rightmost (least significant) bit represent years: 1993, 1998, 2003, 2005, 2010, 2015, 2020, 2025	No	No	No	Bitmap
oag_model_nm	OAG Equipment Model Name	Yes	No	No	Name
OAG AIRLINE	This table gives the OAG codes for airlines listed in the OAG. These may differ from the DOT codes, even for the same airline.				
Attribute Name	Attribute Definition	Required	PK	FK	Domain Name
airline_oag_cd	OAG Carrier Code	Yes	Yes	No	Airline_Code
airline_code_share	TRUE if a code sharing airline	Yes	No	No	Boolean
OAG AIRPORT DATA	Fifteen minute time series of OAG departures and arrivals.				
Attribute Name	*Attribute Definition*	*Required*	*PK*	*FK*	*Domain Name*
day_oag_cd	OAG Code for day of the week (1=Monday ... 7=Sunday)	Yes	Yes	Yes	Day_ID
port_data_depart_cnt	Count of departures at airport	No	No	No	Item_Count
oag_model_cd	OAG Equipment Model Code	Yes	Yes	Yes	Equipment_Code
oag_place_cd	OAG Place Code (Airport or City)	Yes	Yes	Yes	OAG_Place_Code
airline_oag_cd	OAG Carrier Code	Yes	Yes	Yes	Airline_Code
port_data_min_num	Minute of airport data	Yes	Yes	No	Minute_Number
port_data_arrival_cnt	Count of arrivals at airport	No	No	No	Item_Count
port_data_hour_num	Hour of airport data	Yes	Yes	No	Hour_Number

Table A-1. QRS Database Entity and Attribute Definitions (Continued)

Entity name	Entity definitions				
port_data_yr	Calendar Year	Yes	Yes	Yes	Year
sys_month_num	System Generated Month ID (1=January ... 12=December)	Yes	Yes	Yes	Month_ID
OAG FARE CLASS	This table describes all of the fare classes available on flights.				
Attribute Name	*Attribute Definition*	*Required*	*PK*	*FK*	*Domain Name*
fare_class_nm	Fare Class Name	Yes	No	No	Name
fare_class_oag_cd	OAG Fare Class Code	Yes	Yes	No	Fare_Class
OAG FLIGHT	This table describes each unique scheduled flight by OAG flight number and day and contains airline, aircraft, airport, and schedule data.				
Attribute Name	*Attribute Definition*	*Required*	*PK*	*FK*	*Domain Name*
flt_sched_arrive_tm	OAG Scheduled Flight Arrival Time	Yes	No	No	Time
oag_model_cd	OAG Equipment Model Code	Yes	No	Yes	Equipment_Code
arrive_port_oag_cd	OAG Place Code (Airport or City)	Yes	No	Yes	OAG_Place_Code
flt_type	Flight Type (Passenger or Cargo)	Yes	No	No	Flight_Type
flt_sched_depart_tm	OAG Scheduled Flight Departure Time	Yes	No	No	Time
sys_flt_num	System Generated OAG Flight ID	Yes	Yes	No	Numeric_Id
airline_oag_cd	OAG Carrier Code	Yes	No	Yes	Airline_Code
flt_eff_range_start_dt	OAG Flight Effective Range Start Date	No	No	No	Date
flt_eff_range_end_dt	OAG Flight Effective Range End Date	No	No	No	Date
flt_oag_num	OAG Flight Number	Yes	No	No	Flight_Number
depart_port_oag_cd	OAG Place Code (Airport or City)	Yes	No	Yes	OAG_Place_Code
flt_sched_elapse_min	OAG Scheduled Flight Elapsed Time (in minutes)	Yes	No	No	Elapsed_Time
OAG FLIGHT DEPARTURE	This table identifies which days of the week a flight from the OAG FLIGHT table is scheduled to depart.				
Attribute Name	*Attribute Definition*	*Required*	*PK*	*FK*	*Domain Name*
depart_day_oag_cd	OAG Code for day of the week (1=Monday ... 7=Sunday)	Yes	Yes	Yes	Day_ID
sys_flt_num	System Generated OAG Flight ID	Yes	Yes	Yes	Numeric_Id
OAG FLIGHT EXCEPTIONS	Exceptions to OAG flight schedules. Exceptions are coded as EX, for excluded dates and OP for operating dates.				
Attribute Name	*Attribute Definition*	*Required*	*PK*	*FK*	*Domain Name*
exception_dt	Date of schedule exception	Yes	Yes	No	Date
sys_flt_num	System Generated OAG Flight ID	Yes	Yes	Yes	Numeric_Id
exception_type	Type of exception (EX or OP)	Yes	No	No	Exception_Type
OAG FLIGHT FARE CLASS	This table correlates the fare classes available on an individual flight with the flight.				
Attribute Name	*Attribute Definition*	*Required*	*PK*	*FK*	*Domain Name*
sys_flt_num	System Generated OAG Flight ID	Yes	Yes	Yes	Numeric_Id
fare_class_oag_cd	OAG Fare Class Code	Yes	Yes	Yes	Fare_Class

Table A-1. QRS Database Entity and Attribute Definitions (Continued)

Entity name	Entity definitions				
OAG FLIGHT SEGMENT DATA	This table contains calculated data on flight segments according to data from the OAG FLIGHT table. This table contains separate rows where two airlines share the same flight segment. OAG NON-SHARED FLIGHT SEGMENT DATA contains the same data but with each flight segment appearing only once.				
Attribute Name	*Attribute Definition*	*Required*	*PK*	*FK*	*Domain Name*
oag_seg_depart_cnt	Count of departures on this segment (calculated from OAG Flight Data)	No	No	No	Item_Count
oag_seg_load_factor	Load factor for this flight segment	No	No	No	Float
oag_seg_depart_port_cd	OAG Place Code (Airport or City)	Yes	Yes	Yes	OAG_Place_Code
oag_seg_total_block_min	Total block time for segment	No	No	No	Item_Count
oag_seg_stage_len	Stage length in miles for this flight segment	No	No	No	Distance
oag_seg_arrive_port_cd	OAG Place Code (Airport or City)	Yes	Yes	Yes	OAG_Place_Code
oag_model_cd	OAG Equipment Model Code	Yes	Yes	Yes	Equipment_Code
airline_oag_cd	OAG Carrier Code	Yes	Yes	Yes	Airline_Code
oag_seg_data_yr	Calendar Year	Yes	Yes	Yes	Year
OAG NETWORK DEFINITION	This table is used to created Network Definition Files (NDFs) for use in the ASAC Flight Segment Cost Model - Mission Generator. This table is used to created Network Definition Files				
Attribute Name	*Attribute Definition*	*Required*	*PK*	*FK*	*Domain Name*
ndf_arrive_port_oag_cd	OAG Place Code (Airport) - Destination airport	Yes	Yes	Yes	OAG_Place_Code
ndf_arrive_min	Minute of flight arrival	Yes	Yes	No	Minute_Number
ndf_block_hr	Block time of flight - hours part	Yes	No	No	Hour_Number
ndf_block_min	Block time of flight - minutes part	Yes	No	No	Minute_Number
ndf_depart_hr	Hour of flight departure (24 hour format)	Yes	Yes	No	Hour_Number
ndf_depart_port_oag_cd	OAG Place Code (Airport) - Origin airport	Yes	Yes	Yes	OAG_Place_Code
ndf_fract_flts_per_day	Fractional flights per day for a given week	Yes	No	No	Float
airline_oag_cd	OAG Carrier Code	Yes	Yes	Yes	Airline_Code
ndf_arrive_hr	Hour of flight arrival (24 hour format)	Yes	Yes	No	Hour_Number
ndf_depart_min	Minute of flight departure	Yes	Yes	No	Minute_Number
oag_model_cd	OAG Equipment Model Code	Yes	Yes	Yes	Equipment_Code
OAG NON-SHARED FLIGHT SEGMENT DATA	This table contains calculated data on flight segments according to data from the OAG FLIGHT table. This table contains only one row where two airlines share the same flight segment. OAG FLIGHT SEGMENT DATA contains the same data but with each airline represented in every flight segment.				
Attribute Name	*Attribute Definition*	*Required*	*PK*	*FK*	*Domain Name*
oag_ns_seg_stage_len	Stage length in miles for this flight segment	No	No	No	Distance
oag_ns_seg_total_block_min	Total block time for segment	No	No	No	Item_Count
oag_ns_data_year	Calendar Year	Yes	Yes	Yes	Year
oag_ns_seg_arrive_port_cd	OAG Place Code (Airport or City)	Yes	Yes	Yes	OAG_Place_Code
oag_ns_seg_depart_port_cd	OAG Place Code (Airport or City)	Yes	Yes	Yes	OAG_Place_Code
oag_model_cd	OAG Equipment Model Code	Yes	Yes	Yes	Equipment_Code
oag_ns_seg_load_factor	Load factor for this flight segment	No	No	No	Float
oag_ns_seg_depart_cnt	Count of departures on this segment (calculated from OAG Flight Data)	No	No	No	Item_Count

Table A-1. QRS Database Entity and Attribute Definitions (Continued)

Entity name	Entity definitions				
OAG NOSHARE AIRPORT	Fifteen minute time series of OAG departures and arrivals, not counting code-sharing flights.				
Attribute Name	*Attribute Definition*	*Required*	*PK*	*FK*	*Domain Name*
port_ns_data_min_num	Minute for airport data	Yes	Yes	No	Minute_Number
oag_place_cd	OAG Place Code (Airport or City)	Yes	Yes	No	OAG_Place_Code
day_oag_cd	OAG Code for day of the week (1=Monday ... 7=Sunday)	Yes	Yes	No	Day_ID
port_ns_data_arrival_cnt	Arrival count for airport	No	No	No	Item_Count
port_ns_data_yr	Year for airport data	Yes	Yes	No	Year
oag_model_cd	OAG Equipment Model Code	Yes	Yes	No	Equipment_Code
sys_month_num	System Generated Month ID (1=January ... 12=December)	Yes	Yes	No	Month_ID
port_ns_data_depart_cnt	Departure count for airport	No	No	No	Item_Count
port_ns_data_hour_num	Hour for airport data	Yes	Yes	No	Hour_Number
OAG PLACE	The OAG combines city and airport codes into a common table, making them indistinguishable. This table contains those codes. The CITY and AIRPORT tables relate here to get the city or airport name.				
Attribute Name	*Attribute Definition*	*Required*	*PK*	*FK*	*Domain Name*
oag_place_lat_degr	Airport Latitude - Degrees part	No	No	No	Degree
oag_place_long_min	Airport Longitude - Minutes part	No	No	No	Minute
oag_place_lat_hemi	Airport Latitude - Hemisphere part	No	No	No	Hemisphere
oag_place_lat_min	Airport Latitude - Minutes part	No	No	No	Minute
oag_place_lat_sec	Airport Latitude - Seconds part	No	No	No	Second
oag_place_long_hemi	Airport Longitude - Hemisphere part	No	No	No	Hemisphere
oag_place_long_sec	Airport Longitude - Seconds part	No	No	No	Second
oag_place_cd	OAG Place Code (Airport or City)	Yes	Yes	No	OAG_Place_Code
oag_place_nm	OAG Place Name (Airport or City)	Yes	No	No	Name
oag_place_long_degr	Airport Longitude - Degrees part	No	No	No	Degree
OD AIRPORT TOTAL	Rollup totals for Origin and Destination airport data elements				
Attribute Name	*Attribute Definition*	*Required*	*PK*	*FK*	*Domain Name*
oad_intl_pass_cnt_arrive_sum	Passenger count for the portion of an international journey which included a U.S. origin and last U.S. port for outbound trips or first U.S. port and a U.S. destination for inbound trips (1/10th sample)	No	No	No	Long_Item_Count
oad_dom_pass_rev_depart_sum	Purely Domestic O&D Passenger Revenues (1/10th sample)	No	No	No	Money
oad_intl_pass_cnt_depart_sum	Passenger count for the portion of an international journey which included a U.S. origin and last U.S. port for outbound trips or first U.S. port and a U.S. destination for inbound trips (1/10th sample)	No	No	No	Long_Item_Count
oad_init_trip_cnt_depart_sum	Number Of Initiated Trips (1/10th sample)	No	No	No	Long_Item_Count
oad_total_port_cd	DOT Place Code (Airport or City)	Yes	Yes	Yes	DOT_Place_Code
oad_init_trip_cnt_arrive_sum	Number Of Initiated Trips (1/10th sample)	No	No	No	Long_Item_Count

Table A-1. QRS Database Entity and Attribute Definitions (Continued)

Entity name	Entity definitions				
oad_dom_pass_cnt_depart_sum	Purely domestic O&D passengers who started their journey at the origin and finished their journey at the destination (1/10th sample)	No	No	No	Long_Item_Count
oad_dom_pass_cnt_arrive_sum	Purely domestic O&D passengers who started their journey at the origin and finished their journey at the destination (1/10th sample)	No	No	No	Long_Item_Count
oad_total_data_yr	Data Year	Yes	Yes	No	Year
oad_dom_pass_rev_arrive_sum	Purely Domestic O&D Passenger Revenues (1/10th sample)	No	No	No	Money
OD FLIGHT SEGMENT TOTAL	Rollup totals for Origin and Destination flight segment data elements				
Attribute Name	*Attribute Definition*	*Required*	*PK*	*FK*	*Domain Name*
oad_seg_dom_pass_rev_sum	Purely Domestic O&D Passenger Revenues (1/10th sample)	No	No	No	Money
oad_seg_avg_itin_miles_sum	Average Itinerary Miles Flown	No	No	No	Float
oad_seg_avg_coupons_sum	Average Coupons Used (a measure of number of flight segments traveled between origin and destination, i.e. If average coupons used equals one, then all flights were direct but not necessarily non-stop)	No	No	No	Float
oad_seg_dom_pass_cnt_sum	Purely domestic O&D passengers who started their journey at the origin and finished their journey at the destination (1/10th sample)	No	No	No	Long_Item_Count
oad_seg_orig_port_cd	DOT Place Code (Airport or City)	Yes	Yes	Yes	DOT_Place_Code
oad_seg_data_yr	Data Year	Yes	Yes	No	Year
oad_seg_dom_zero_fare_cnt_sum	Purely domestic O&D passengers who paid zero fare (1/10th sample)	No	No	No	Long_Item_Count
oad_seg_intl_pass_cnt_sum	Passenger count for the portion of an international journey which included a U.S. origin and last U.S. port for outbound trips or first U.S. port and a U.S. destination for inbound trips (1/10th sample)	No	No	No	Long_Item_Count
oad_seg_dest_port_cd	DOT Place Code (Airport or City)	Yes	Yes	Yes	DOT_Place_Code
OPERATOR	This table describes organizations which operate flights. These organizations may or may not be airlines. The type of operator is described in OPERATOR_TYPE.				
Attribute Name	*Attribute Definition*	*Required*	*PK*	*FK*	*Domain Name*
world_area_cd	World Area Code	No	No	Yes	World_Area_Code
oper_nm	Operator Name	Yes	No	No	Name
sys_oper_type_num	System Generated Operator Type ID Number	Yes	No	Yes	Numeric_Id
sys_oper_num	System Generated Operator ID	Yes	Yes	No	Numeric_Id
OPERATOR TYPE	Describes types of operators as airlines, governments, etc.				
Attribute Name	*Attribute Definition*	*Required*	*PK*	*FK*	*Domain Name*
sys_oper_type_num	System Generated Operator Type ID Number	Yes	Yes	No	Numeric_Id
oper_type_nm	Operator type name (airline, government, leasing company, etc.)	Yes	No	No	Name

Table A-1. QRS Database Entity and Attribute Definitions (Continued)

Entity name	Entity definitions				
ORIGIN AND DESTINATION	Data for all origin and destination pairs defined among the top 200 U.S. airports (with outbound specified as direction) starting with CY 1993 and working backwards for 5 years.				
Attribute Name	*Attribute Definition*	*Required*	*PK*	*FK*	*Domain Name*
oad_dom_pass_cnt	Purely domestic O&D passengers who started their journey at the origin and finished their journey at the destination (1/10th sample)	No	No	No	Long_Item_Count
oad_dom_zero_fare_cnt	Purely domestic O&D passengers who paid zero fare (1/10th sample)	No	No	No	Long_Item_Count
oad_data_qtr	Data Quarter	Yes	Yes	No	Quarter
oad_avg_coupons	Average Coupons Used (a measure of number of flight segments traveled between origin and destination, i.e. If average coupons used equals one, then all flights were direct but not necessarily non-stop)	No	No	No	Float
oad_avg_itin_miles	Average Itinerary Miles Flown	No	No	No	Float
oad_dom_pass_rev	Purely Domestic O&D Passenger Revenues (1/10th sample)	No	No	No	Money
oad_init_trip_cnt	Number Of Initiated Trips (1/10th sample)	No	No	No	Long_Item_Count
oad_intl_pass_cnt	Passenger count for the portion of an international journey which included a U.S. origin and last U.S. port for outbound trips or first U.S. port and a U.S. destination for inbound trips (1/10th sample)	No	No	No	Long_Item_Count
oad_orig_port_cd	DOT Place Code (Airport or City)	Yes	Yes	Yes	DOT_Place_Code
oad_dest_port_cd	DOT Place Code (Airport or City)	Yes	Yes	Yes	DOT_Place_Code
oad_data_year	Origin and Destination Data Year	Yes	Yes	No	Year
PROFIT AND LOSS	Form 41 P-1.1 summary profit and loss statement for Group I airlines by entity. Form 41 P1.2 summary profit and loss statement for Group II and III airlines by entity.				
Attribute Name	*Attribute Definition*	*Required*	*PK*	*FK*	*Domain Name*
pl_data_yr	Profit and Loss Data Year	Yes	Yes	No	Year
airline_dot_cd	DOT Carrier Code	Yes	Yes	Yes	Airline_Code
entity_dot_cd	Carrier Entity DOT identifier code	Yes	Yes	Yes	Entity
pl_exp_interest_ltd	Interest on LTD and capital leases	No	No	No	Money
pl_exp_income_tax	Income tax expense	No	No	No	Money
pl_exp_depr_amort	Depreciation and amortization	No	No	No	Money
pl_exp_nonoper	Other non-operating expense	No	No	No	Money
pl_rev_freight	Mail and freight revenues	No	No	No	Money
pl_extra_items	Discontinued operations, extraordinary items, accounting changes	No	No	No	Money
pl_exp_ga	General and administrative expense	No	No	No	Money
pl_exp_interest_other	Other interest expense	No	No	No	Money
pl_exp_maint	Maintenance expense	No	No	No	Money
pl_rev_pass	Passenger revenues	No	No	No	Money
pl_exp_transport	Transport-related expense	No	No	No	Money
pl_exp_traffic_serv	A/C and traffic service expense	No	No	No	Money
pl_exp_promot_sales	Promotion and sales expense	No	No	No	Money
pl_exp_pass_serv	Passenger service expense	No	No	No	Money
pl_exp_oper	Flying operations expense	No	No	No	Money
pl_rev_other	Other revenues	No	No	No	Money

Table A-1. QRS Database Entity and Attribute Definitions (Continued)

Entity name	Entity definitions				
pl_rev_charter	Charter revenues	No	No	No	Money
RETIRED WORLD AREA	This table contains retired world area codes and their replacement codes.				
Attribute Name	*Attribute Definition*	*Required*	*PK*	*FK*	*Domain Name*
old_world_area_cd	World Area Code	Yes	Yes	Yes	World_Area_Code
new_world_area_cd	World Area Code	Yes	Yes	Yes	World_Area_Code
TAF DATA	Constant Terminal Area Forecast (TAF) data for airports (does not vary year to year).				
Attribute Name	*Attribute Definition*	*Required*	*PK*	*FK*	*Domain Name*
taf_avg_vfr_days	Average VFR days/year	No	No	No	Float
taf_ils_runway_cnt	Number of instrument landing system (ILS) equipped runways	No	No	No	Item_Count
taf_forecast_start_yr	Year that TAF operations data begins being forecasted, as opposed to being actual.	Yes	No	No	Year
taf_base_yr	Base year for TAF Operations data	Yes	No	No	Year
taf_pract_ann_cap	Practical annual capacity	No	No	No	Float
taf_runway_cnt	Number of runways	No	No	No	Item_Count
taf_place_cd	TAF Airport Code	Yes	Yes	Yes	TAF_Place_Code
TAF OPERATIONS	Variable Terminal Area Forecast (TAF) data for airports. This table contains forecast data for each airport by year, based on the base year found for the corresponding airport in TAF_DATA.				
Attribute Name	*Attribute Definition*	*Required*	*PK*	*FK*	*Domain Name*
taf_oper_mil_local	Military local operations	No	No	No	Item_Count
taf_oper_yr	Operation year for data	Yes	Yes	No	Year
taf_oper_carr_enplane	Air carrier enplanements	No	No	No	Item_Count
taf_oper_gen_avi_local	General aviation local operations	No	No	No	Item_Count
taf_oper_carr_itin	Air carrier itinerant operations	No	No	No	Item_Count
taf_oper_comm_enplane	Commuter enplanements	No	No	No	Item_Count
taf_oper_gen_avi_itin	General aviation itinerant operations	No	No	No	Item_Count
taf_oper_taxi_enplane	Air taxi enplanements	No	No	No	Item_Count
taf_oper_taxi_itin	Air taxi itinerant operations	No	No	No	Item_Count
taf_oper_intl_enplane	International enplanements	No	No	No	Item_Count
taf_place_cd	TAF Airport Code	Yes	Yes	Yes	TAF_Place_Code
taf_oper_mil_itin	Military itinerant operations	No	No	No	Item_Count
TAF PLACE	This table contains the TAF codes for airports and cities.				
Attribute Name	*Attribute Definition*	*Required*	*PK*	*FK*	*Domain Name*
taf_place_cd	TAF Airport Code	Yes	Yes	No	TAF_Place_Code
us_state_cd	US State Code	No	No	Yes	State_Code
taf_place_nm	TAF Airport Name	No	No	No	Name
taf_us_region_cd	TAF US Region Code	No	No	Yes	US_Region_Code
taf_city_nm	TAF City Name (the city that the airport is in)	No	No	No	Name
TAF US REGION	Describes US regions for US cities as used in TAF data.				
Attribute Name	*Attribute Definition*	*Required*	*PK*	*FK*	*Domain Name*
taf_us_region_cd	TAF US Region Code	Yes	Yes	No	US_Region_Code
taf_us_region_nm	US Region Name	Yes	No	No	Name

Table A-1. QRS Database Entity and Attribute Definitions (Continued)

Entity name	Entity definitions				
TAP WEATHER	Hourly Terminal Area Productivity weather data for 10 major airports, 1961-1995				
Attribute Name	*Attribute Definition*	*Required*	*PK*	*FK*	*Domain Name*
dot_place_cd	DOT Place Code (Airport or City)	Yes	Yes	Yes	DOT_Place_Code
wx_date	Date of weather observation	Yes	Yes	No	Date
wx_hour	Hour of weather observation 1 = midnight to 12:59:59AM 24 = 11PM - 11:59:59PM	Yes	Yes	No	Hour_Number
wx_ceiling_height	Ceiling height in feet. (Range: 0 - 50000; 77777=unlimited; 88888=cirroform)	No	No	No	Height
wx_horiz_visibility	Horizontal visibility in miles. (Range: 0 - 100; 777=unlimited)	No	No	No	Visibility
wx_meteor_cond	Meteorological conditions (VFR1, VFR2, IFR1, IFR2)	No	No	No	Meteor_Condition
wx_obs_indicator	Weather observation indicator (0 = Weather observation made; 1 = Weather observation missing or replaced with prev. 1 or 2 hour's data)	Yes	No	No	Indicator
wx_runway_cond	Wet or dry runway conditions. 1=Wet, 0=Dry or indeterminable (ATL: Wet=17%, Dry=83%)	No	No	No	Indicator
wx_temperature	Temperature in degrees Fahrenheit	No	No	No	Temperature
wx_wind_direction	Wind direction in degrees (0,360=N;90=E;180=S;270=W)	No	No	No	Direction
wx_wind_speed	Wind speed in knots (Range: 0-91)	No	No	No	Velocity
TRAFFIC	Form 41 T-2 equipment-specific traffic data by airline and entity.				
Attribute Name	*Attribute Definition*	*Required*	*PK*	*FK*	*Domain Name*
traf_sched_rpm	Scheduled revenue passenger miles	No	No	No	Long_Item_Count
traf_sched_ns_ac_rev_mi	Scheduled and non-scheduled A/C revenue miles	No	No	No	Item_Count
traf_sched_total_atm	Scheduled total available ton miles (in 1000s)	No	No	No	Long_Item_Count
traf_sched_ns_freight_rtm	Scheduled and non-scheduled freight revenue ton miles (in 1000s)	No	No	No	Long_Item_Count
traf_sched_ns_mail_rtm	Scheduled and non-scheduled mail revenue ton miles (in 1000s)	No	No	No	Long_Item_Count
traf_sched_ns_rpm	Scheduled and non-scheduled revenue passenger miles	No	No	No	Long_Item_Count
traf_sched_pass_enplane	Scheduled passenger enplanements	No	No	No	Item_Count
traf_sched_ns_total_atm	Scheduled and non-scheduled total available ton miles (in 1000s)	No	No	No	Long_Item_Count
traf_sched_asm	Scheduled available seat miles	No	No	No	Long_Item_Count
traf_sched_ns_ac_rev_dep	Scheduled and non-scheduled A/C revenue departures	No	No	No	Item_Count
traf_sched_total_rtm	Scheduled total revenue ton miles (in 1000s)	No	No	No	Long_Item_Count
traf_data_yr	Traffic Data Year	Yes	Yes	No	Year
traf_craft_days	Aircraft days, carrier routes	No	No	No	Item_Count
traf_block_hours	Block hours	No	No	No	Item_Count
traf_airborne_hours	Airborne hours	No	No	No	Item_Count
dot_model_cd	DOT Equipment Model Code	Yes	Yes	Yes	Equipment_Code
entity_dot_cd	Carrier Entity DOT identifier code	Yes	Yes	Yes	Entity

Table A-1. QRS Database Entity and Attribute Definitions (Continued)

Entity name	**Entity definitions**				
traf_sched_ns_asm	Scheduled and non-scheduled available seat miles	No	No	No	Long_Item_Count
traf_fuel_gal	Gallons of fuel	No	No	No	Item_Count
airline_dot_cd	DOT Carrier Code	Yes	Yes	Yes	Airline_Code
US STATE	Contains names of US states keyed by two-letter abbreviations.				
Attribute Name	*Attribute Definition*	*Required*	*PK*	*FK*	*Domain Name*
us_state_cd	US State Code	Yes	Yes	No	State_Code
us_state_nm	US State Name	Yes	No	No	Name
WORLD AREA	Describes world areas as used by OAG data.				
Attribute Name	*Attribute Definition*	*Required*	*PK*	*FK*	*Domain Name*
world_area_nm	World Area Name	Yes	No	No	Name
world_area_grp_cd	World Area Group Code	Yes	No	Yes	World_Area_Code
world_area_cd	World Area Code	Yes	Yes	No	World_Area_Code
WORLD AREA GROUP	Defines grouping (roughly by continent) of World Area Codes.				
Attribute Name	*Attribute Definition*	*Required*	*PK*	*FK*	*Domain Name*
world_area_grp_nm	World Area Group Name	Yes	No	No	Name
world_area_grp_cd	World Area Group Code	Yes	Yes	No	World_Area_Code
YEAR	Associates a year with its correct entry in the perpetual calendar table.				
Attribute Name	*Attribute Definition*	*Required*	*PK*	*FK*	*Domain Name*
cal_id_num	Calendar ID Number	Yes	No	Yes	Calendar_ID
year_num	Calendar Year	Yes	Yes	No	Year

QRS DATABASE PHYSICAL DEVICE ALLOCATIONS

Table A-2. QRS Database Physical Device Allocations

Volume group	Logical volume	Size (in MB)	Contents	Database
/dev/vg01	lvol1	500	/sybase	N/A
/dev/vg01	rlvol2	300	logdev	master
/dev/vg01	rlvol3	100	datadev1	ASACQRS
/dev/vg01	unused	100	unused	N/A
/dev/vg02	rlvol1	40	master	master
/dev/vg02	rlvol2	732	asqp_ddev	ASACQRS
/dev/vg02	rlvol3	52	oagdep_ddev	ASACQRS
/dev/vg02	rlvol4	16	places_dxdev	ASACQRS
/dev/vg02	rlvol5	32	od_xdev	ASACQRS
/dev/vg02	rlvol6	128	datadev2	ASACQRS
/dev/vg03	rlvol1	40	master (mirror)	master
/dev/vg03	rlvol2	428	asqp_xdev	ASACQRS
/dev/vg03	rlvol3	24	oag_dep_xdev	ASACQRS
/dev/vg03	rlvol4	20	odfstot_dxdev	ASACQRS
/dev/vg03	rlvol5	488	datadev3	ASACQRS
/dev/vg04	rlvol1	12	sybsecurity	sybsecurity
/dev/vg04	rlvol2	500	tempdb_dev	tempdb
/dev/vg04	rlvol3	48	oagfl_xdev	ASACQRS
/dev/vg04	rlvol4	52	dotfs_ddev	ASACQRS
/dev/vg04	rlvol5	388	datadev4	ASACQRS
/dev/vg05	rlvol1	32	sybsystemproc	sybsystemproc
/dev/vg05	rlvol2	36	oagflt_ddev	ASACQRS
/dev/vg05	rlvol3	36	nshport_ddev	ASACQRS
/dev/vg05	rlvol4	16	oagfs_ddev	ASACQRS
/dev/vg05	rlvol5	92	dotfs_xdev	ASACQRS
/dev/vg05	rlvol6	52	reportspec_dev	REPORTSPEC
/dev/vg05	rlvol7	200	wx_xdev	ASACQRS
/dev/vg05	rlvol8	100	datadev5	unused
/dev/vg05	rlvol9	100	datadev6	ASACQRS
/dev/vg05	rlvol10	100	datadev7	ASACQRS
/dev/vg05	rlvol11	100	datadev8	ASACQRS
/dev/vg05	rlvol12	132	datadev9	ASACQRS
/dev/vg06	rlvol1	24	oagfare_dxdev	ASACQRS
/dev/vg06	rlvol2	112	nshport_xdev	ASACQRS
/dev/vg06	rlvol3	12	oagfs_xdev	ASACQRS
/dev/vg06	rlvol4	60	od_ddev	ASACQRS
/dev/vg06	rlvol5	176	wx_ddev	ASACQRS
/dev/vg06	rlvol6	100	datadev10	unused
/dev/vg06	rlvol7	100	datadev11	ASACQRS
/dev/vg06	rlvol8	100	datadev12	ASACQRS
/dev/vg06	rlvol9	100	datadev13	unused
/dev/vg06	rlvol10	100	datadev14	unused
/dev/vg06	rlvol11	116	datadev15	unused

QRS DATABASE DEVICE USAGE

Table A-3. QRS Database Device Usage

Device	Segments	Size (in MB)	Usage	Free MB
asqp_ddev	asqp_dseg	732.00	data only	732.00
asqp_xdev	asqp_xseg	428.00	data only	81.53
datadev1	default	100.00	data only	64.77
	system			
datadev2	default	128.00	data only	128.00
datadev3	default	488.00	data only	412.02
datadev4	dotfs_xseg	388.00	data only	6.28
	oagfare_dxseg			
	oagfl_xseg			
	oagflt_dseg			
	od_dxseg			
datadev5	dotfs_xseg	100.00	data only	3.13
	od_dxseg			
datadev6	asqp_dseg	100.00	data only	47.84
datadev7	asqp_dseg	100.00	data only	8.83
datadev8	asqp_dseg	100.00	data only	9.56
datadev9	asqp_dseg	132.00	data only	13.16
datadev10	dotfs_dseg	100.00	data only	95.58
datadev11	asqp_dseg	100.00	data only	9.95
datadev12	asqp_dseg	100.00	data only	35.98
datadev13	od_dxseg	100.00	data only	65.03
	odfstot_dxseg			
datadev14	unused	100.00	data only	100.00
datadev15	unused	116.00	data only	116.00
dotfs_ddev	dotfs_dseg	52.00	data only	1.58
dotfs_xdev	dotfs_xseg	92.00	data only	2.44
logdev	logsegment	50.00	log only	49.98
logdev		75.00	log only	75.00
nshport_ddev	nshport_dseg	36.00	data only	18.33
nshport_xdev	nshport_xseg	112.00	data only	45.91
oagdep_ddev	oagdep_dxseg	52.00	data only	24.78
oagdep_xdev	oagdep_dxseg	24.00	data only	24.00
oagfare_dxdev	oagfare_dxseg	24.00	data only	8.48
oagfl_xdev	oagfl_xseg	48.00	data only	6.58
oagflt_ddev	oagflt_dseg	36.00	data only	4.27
oagfs_ddev	oagfs_dseg	16.00	data only	12.36
oagfs_xdev	oagfs_xseg	12.00	data only	9.23
od_ddev	od_dxseg	60.00	data only	1.83
od_xdev	od_dxseg	32.00	data only	0.98
odfstot_dxdev	odfstot_dxseg	20.00	data only	0.59
places_dxdev	places_dxseg	16.00	data only	12.66
wx_ddev	wx_dseg	176.00	data only	144.75
wx_xdev	wx_xseg	200.00	data only	187.02
Total		4,545.00		2,560.42

QRS DATABASE SEGMENT USAGE

Table A-4. QRS Database Segment Usage

Segment	Physical device	Device size (MB)	Segment size (MB)	Table name	Index name
system	datadev1	100	100	sysalternates	sysalternates
				sysattributes	csysattributes
				sysattributes	ncsysattributes
				sysattributes	tsysattributes
				syscolumns	syscolumns
				sysconstraints	csysconstraints
				sysconstraints	ncsysconstraints
				sysdepends	sysdepends
				sysgams	sysgams
				sysindexes	sysindexes
				syskeys	syskeys
				sysobjects	sysobjects
				sysobjects	ncsysobjects
				syspartitions	csyspartitions
				sysprocedures	sysprocedures
				sysprotects	sysprotects
				sysroles	csysroles
				syssegments	syssegments
				systhresholds	csysthresholds
				systypes	systypes
				systypes	ncsystypes
				sysusers	sysusers
				sysusers	ncsysusers1
				sysusers	ncsysusers2
default	datadev1	100	716	AIRCRAFT_INVENTORY	XPKAIRCRAFT_INVENTORY
	datadev2	128		AIRCRAFT_MODEL_TYPE	XPKAIRCRAFT_MODEL_TYPE
	datadev3	488		AIRLINE_ENTITY	AIRLINE_ENTITY
				AIRLINE_ENTITY	XPKAIRLINE_ENTITY
				AIRLINE_OPERATOR	AIRLINE_OPERATOR
				AIRLINE_OPERATOR	XPKAIRLINE_OPERATOR
				AIRPORT_DISTANCE	XPKAIRPORT_DISTANCE
				AIRPORT_RANK	XPKAIRPORT_RANK
				ASQP_AIRPORT_TOTAL	ASQP_AIRPORT_TOTAL
				ASQP_AIRPORT_TOTAL	XPKASQP_FLIGHT_SCHEDULE
				ASQP_FLIGHT_SEGMENT_TOTAL	XPKASQP_FLIGHT_SEGMENT_TOTALS
				B43_INVENTORY	XPKB43_INVENTORY
				BALANCE_SHEET	XPKBALANCE_SHEET
				CALENDAR	XPKCALENDAR
				CALENDAR_ID	CALENDAR_ID

Table A-4. QRS Database Segment Usage (Continued)

Segment	Physical device	Device size (MB)	Segment size (MB)	Table name	Index name
				CALENDAR_ID	XPKCALENDAR_ID
				CODE_SHARING_AIRLINE	CODE_SHARING_AIRLINE
				CODE_SHARING_AIRLINE	XPKCODE_SHARING_AIRLINE
				DAYS	DAYS
				DAYS	XPKDAYS
				DOT_AIRCRAFT_MODEL	XPKDOT_AIRCRAFT_MODEL
				DOT_AIRCRAFT_MODEL	XIE2DOT_AIRCRAFT_MODEL
				DOT_AIRCRAFT_MODEL	XIE3DOT_AIRCRAFT_MODEL
				DOT_AIRLINE	DOT_AIRLINE
				DOT_AIRLINE	XPKAIRLINE
				EMPLOYEE_COUNT	EMPLOYEE_COUNT
				EMPLOYEE_COUNT	XPKEMPLOYEE_COUNT
				ENGINE	ENGINE
				ENGINE	XPKENGINE
				GROUP_1_OPERATING_COSTS	GROUP_1_OPERATING_COSTS
				GROUP_1_OPERATING_COSTS	XPKGROUP_1_OPERATING_COSTS
				GROUP_23_OPERATING_COSTS	GROUP_23_OPERATING_COSTS
				GROUP_23_OPERATING_COSTS	XPKGROUP_23_OPERATING_COSTS
				MANUFACTURER	XPKMANUFACTURER
				MONTHS	XPKMONTHS
				OAG_AIRCRAFT_MODEL	XPKOAG_AIRCRAFT_MODEL
				OAG_AIRCRAFT_MODEL	XIE2OAG_AIRCRAFT_MODEL
				OAG_AIRLINE	XPKOAG_AIRLINE
				OAG_AIRPORT_DATA	XPKOAG_AIRPORT_DATA
				OAG_AIRPORT_DATA	XIE1OAG_AIRPORT_DATA
				OAG_AIRPORT_DATA	XIE2OAG_AIRPORT_DATA
				OAG_AIRPORT_DATA	XIE3OAG_AIRPORT_DATA
				OAG_AIRPORT_DATA	XIE4OAG_AIRPORT_DATA
				OAG_AIRPORT_DATA	XIE5OAG_AIRPORT_DATA
				OAG_AIRPORT_DATA	XIE6OAG_AIRPORT_DATA
				OAG_FARE_CLASS	OAG_FARE_CLASS
				OAG_FARE_CLASS	XPKFARE_CLASS
				OAG_FLIGHT_EXCEPTIONS	OAG_FLIGHT_EXCEPTIONS
				OAG_FLIGHT_EXCEPTIONS	XPKEXCEPTIONS
				OAG_NOSHARE_FLIGHT_SEG_DAT	XPKOAG_NO_SHARE_FL_SEG_DAT

Table A-4. QRS Database Segment Usage (Continued)

Segment	Physical device	Device size (MB)	Segment size (MB)	Table name	Index name
				OAG_NOSHARE_FLIGHT_SEG_DAT	XIE1OAG_NO_SHARE_FL_SEG_DAT
				OAG_NOSHARE_FLIGHT_SEG_DAT	XIE2OAG_NO_SHARE_FL_SEG_DAT
				OD_AIRPORT_TOTAL	XPKOD_AIRPORT_TOTAL
				OPERATOR	XPKOPERATOR
				OPERATOR_TYPE	OPERATOR_TYPE
				OPERATOR_TYPE	XPKOPERATOR_TYPE
				PROFIT_AND_LOSS	PROFIT_AND_LOSS
				PROFIT_AND_LOSS	XPKPROFIT_AND_LOSS
				TAF_DATA	TAF_DATA
				TAF_DATA	XPKTAF_DATA
				TAF_OPERATIONS	TAF_OPERATIONS
				TAF_OPERATIONS	XPKTAF_OPERATIONS
				TAF_OPERATIONS	XIE1TAF_OPERATIONS
				TAF_US_REGION	TAF_US_REGION
				TAF_US_REGION	XPKUS_REGION
				TRAFFIC	TRAFFIC
				TRAFFIC	XPKTRAFFIC
				YEAR	YEAR
				YEAR	XPKYEAR
				syscomments	syscomments
				sysreferences	csysreferences
				sysreferences	ncsysreferences
				sysreferences	nc2sysreferences
				sysusermessages	csysusermessages
				sysusermessages	ncsysusermessages
logsegment	logdev	125	125	syslogs	syslogs
asqp_dseg	asqp_ddev	732	1,752	ASQP_FLIGHT_SCHEDULE	XIE1ASQP_FLIGHT_SCHEDULE
	datadev4	388			
	datadev6	100			
	datadev7	100			
	datadev8	100			
	datadev9	132			
	datadev11	100			
	datadev12	100			
asqp_xseg	asqp_xdev	428	428	ASQP_FLIGHT_SCHEDULE	XIE2ASQP_FLIGHT_SCHEDULE
				ASQP_FLIGHT_SCHEDULE	XIE3ASQP_FLIGHT_SCHEDULE
				ASQP_FLIGHT_SCHEDULE	XIF130ASQP_FLIGHT_SCHEDULE
dotfs_dseg	dotfs_ddev	52	152	DOT_FLIGHT_SEGMENT_DATA	DOT_FLIGHT_SEGMENT_DATA
	datadev10	100			

Table A-4. QRS Database Segment Usage (Continued)

Segment	Physical device	Device size (MB)	Segment size (MB)	Table name	Index name
dotfs_xseg	datadev4	388	581	DOT_FLIGHT_SEGMENT_DATA	XPKFLIGHT_SEGMENT_DATA
	datadev5	100		DOT_FLIGHT_SEGMENT_DATA	XIE1DOT_FLIGHT_SEGMENT_DATA
	dotfs_xdev	93		DOT_FLIGHT_SEGMENT_DATA	XIE2DOT_FLIGHT_SEGMENT_DATA
				DOT_FLIGHT_SEGMENT_DATA	XIE3DOT_FLIGHT_SEGMENT_DATA
				DOT_FLIGHT_SEGMENT_DATA	XIE4DOT_FLIGHT_SEGMENT_DATA
				DOT_FLIGHT_SEGMENT_DATA	XIE5DOT_FLIGHT_SEGMENT_DATA
nshport_dseg	nshport_ddev	36	36	OAG_NOSHARE_AIRPORT_DATA	XPKOAG_NOSHARE_AIRPORT_DATA
nshport_xseg	nshport_xdev	112	112	OAG_NOSHARE_AIRPORT_DATA	XIE1OAG_NOSHARE_AIRPORT_DATA
				OAG_NOSHARE_AIRPORT_DATA	XIE2OAG_NOSHARE_AIRPORT_DATA
				OAG_NOSHARE_AIRPORT_DATA	XIE3OAG_NOSHARE_AIRPORT_DATA
				OAG_NOSHARE_AIRPORT_DATA	XIE4OAG_NOSHARE_AIRPORT_DATA
				OAG_NOSHARE_AIRPORT_DATA	XIE5OAG_NOSHARE_AIRPORT_DATA
oagdep_dxseg	oagdep_ddev	52	76	OAG_FLIGHT_DEPARTURE	XPKFLIGHT_DEPARTURE
	oagdep_xdev	24			
oagfare_dxseg	datadev4	388	412	OAG_FLIGHT_FARE_CLASS	XPKFLIGHT_FARE_CLASS
	oagfare_dxdev	24			
oagfl_xseg	datadev4	388	436	OAG_FLIGHT	XPKOAG_FLIGHT
	oagfl_xdev	48		OAG_FLIGHT	XIF124OAG_FLIGHT
				OAG_FLIGHT	XIF125OAG_FLIGHT
				OAG_FLIGHT	XIF126OAG_FLIGHT
				OAG_FLIGHT	XIF77OAG_FLIGHT
				OAG_FLIGHT	XIE1OAG_FLIGHT
oagflt_dseg	datadev4	388	424	OAG_FLIGHT	XIE2OAG_FLIGHT
	oagflt_ddev	36			
oagfs_dseg	oagfs_ddev	16	16	OAG_FLIGHT_SEGMENT_DATA	XPKOAG_FLIGHT_SEGMENT_DATA
oagfs_xseg	oagfs_xdev	12	12	OAG_FLIGHT_SEGMENT_DATA	XIE1OAG_FLIGHT_SEGMENT_DATA
				OAG_FLIGHT_SEGMENT_DATA	XIE2OAG_FLIGHT_SEGMENT_DATA
				OAG_FLIGHT_SEGMENT_DATA	XIE3OAG_FLIGHT_SEGMENT_DATA
od_dxseg	od_ddev	60	680	ORIGIN_AND_DESTINATION	XPKORIGIN_AND_DESTINATION
	od_xdev	32			

Table A-4. QRS Database Segment Usage (Continued)

Segment	Physical device	Device size (MB)	Segment size (MB)	Table name	Index name
	datadev4	388			
	datadev5	100			
	datadev13	100			
odfstot_dxseg	odfstot_dxdev	20	20	OD_FLIGHT_SEGMENT_TOTAL	XPKOD_FLIGHT_SEGMENT_TOTAL
places_dxseg	places_dxdev	16	16	AIRPORT	AIRPORT
				AIRPORT	XPKAIRPORT
				AIRPORT_CITY	AIRPORT_CITY
				AIRPORT_CITY	XPKAIRPORT_CITY
				CITY	CITY
				CITY	XPKCITY
				DOT_AIRPORT_CITY_COUNT	XPKDOT_AIRPORT_CITY_COUNT
				DOT_PLACE	XIE1DOT_PLACE
				DOT_PLACE	XPKDOT_PLACE
				OAG_PLACE	XIE1OAG_PLACE
				OAG_PLACE	XPKOAG_PLACE
				RETIRED_WORLD_AREA	RETIRED_WORLD_AREA
				RETIRED_WORLD_AREA	XPKRETIRED_WORLD_AREA
				TAF_PLACE	XIE1TAF_PLACE
				TAF_PLACE	XPKTAF_PLACE
				US_STATE	US_STATE
				US_STATE	XPKUS_STATE
				WORLD_AREA	WORLD_AREA
				WORLD_AREA	XIE1WORLD_AREA
				WORLD_AREA	XPKWORLD_AREA
				WORLD_AREA_GROUP	WORLD_AREA_GROUP
				WORLD_AREA_GROUP	XPKWORLD_AREA_GROUP
wx_dseg	wx_ddev	176	176	ALTITUDE_PRESSURE	XPKALTITUDE_PRESSURE
				HIGH_ALTITUDE_WIND	XPKHIGH_ALTITUDE_WIND
				TAP_WEATHER	XPKTAP_WEATHER
wx_xseg	wx_xdev	200	200	HIGH_ALTITUDE_WIND	XIE1HIGH_ALTITUDE_WIND
				HIGH_ALTITUDE_WIND	XIE2HIGH_ALTITUDE_WIND
				TAP_WEATHER	XIE1TAP_WEATHER
				TAP_WEATHER	XIE2TAP_WEATHER
				TAP_WEATHER	XIE3TAP_WEATHER
				TAP_WEATHER	XIE4TAP_WEATHER

QRS DATABASE ENTITY-RELATIONSHIP DIAGRAM

Figure A-2. QRS Database Entity-Relationship Diagram

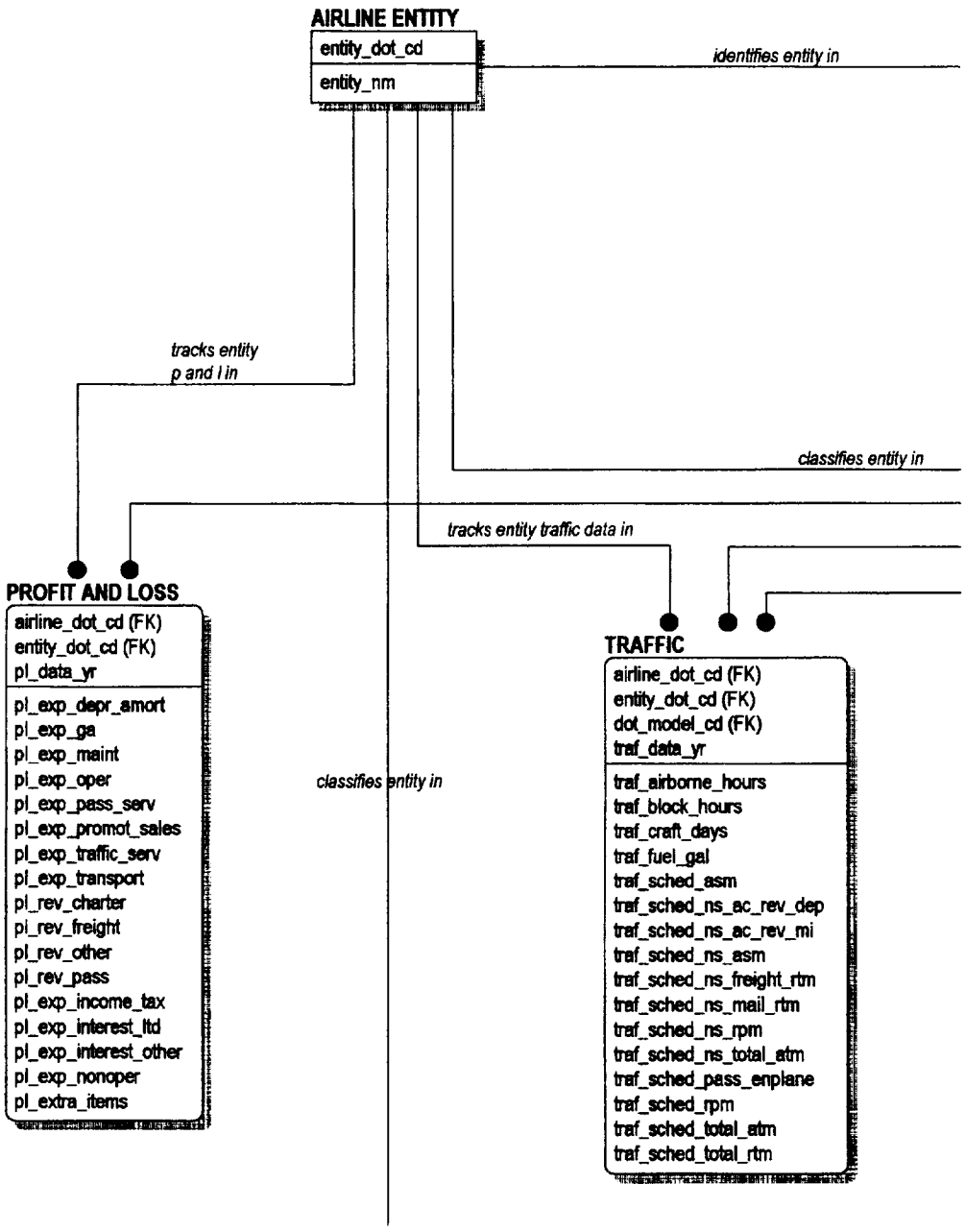


Figure A-2. QRS Database Entity-Relationship Diagram (Continued)

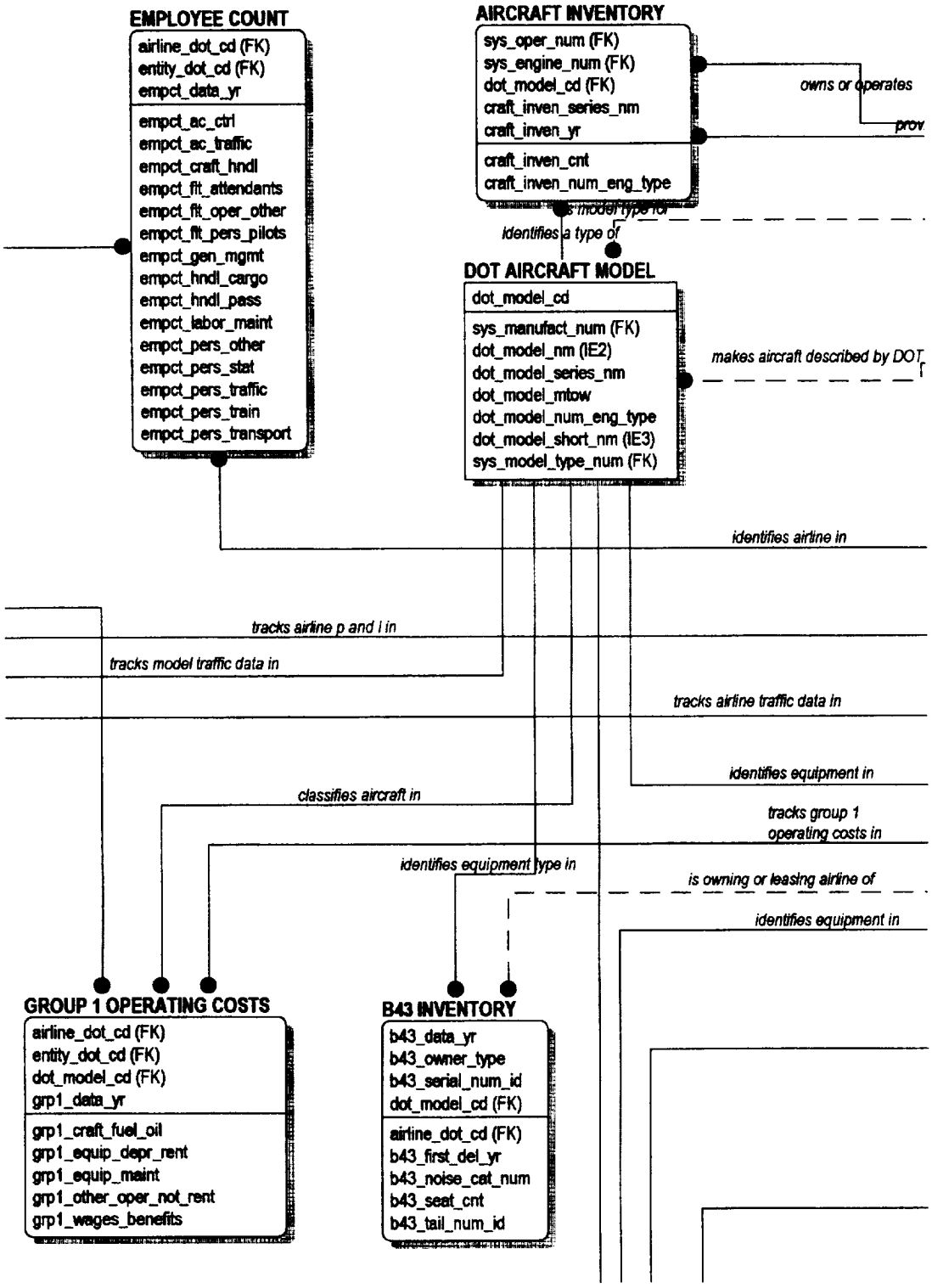


Figure A-2. QRS Database Entity-Relationship Diagram (Continued)

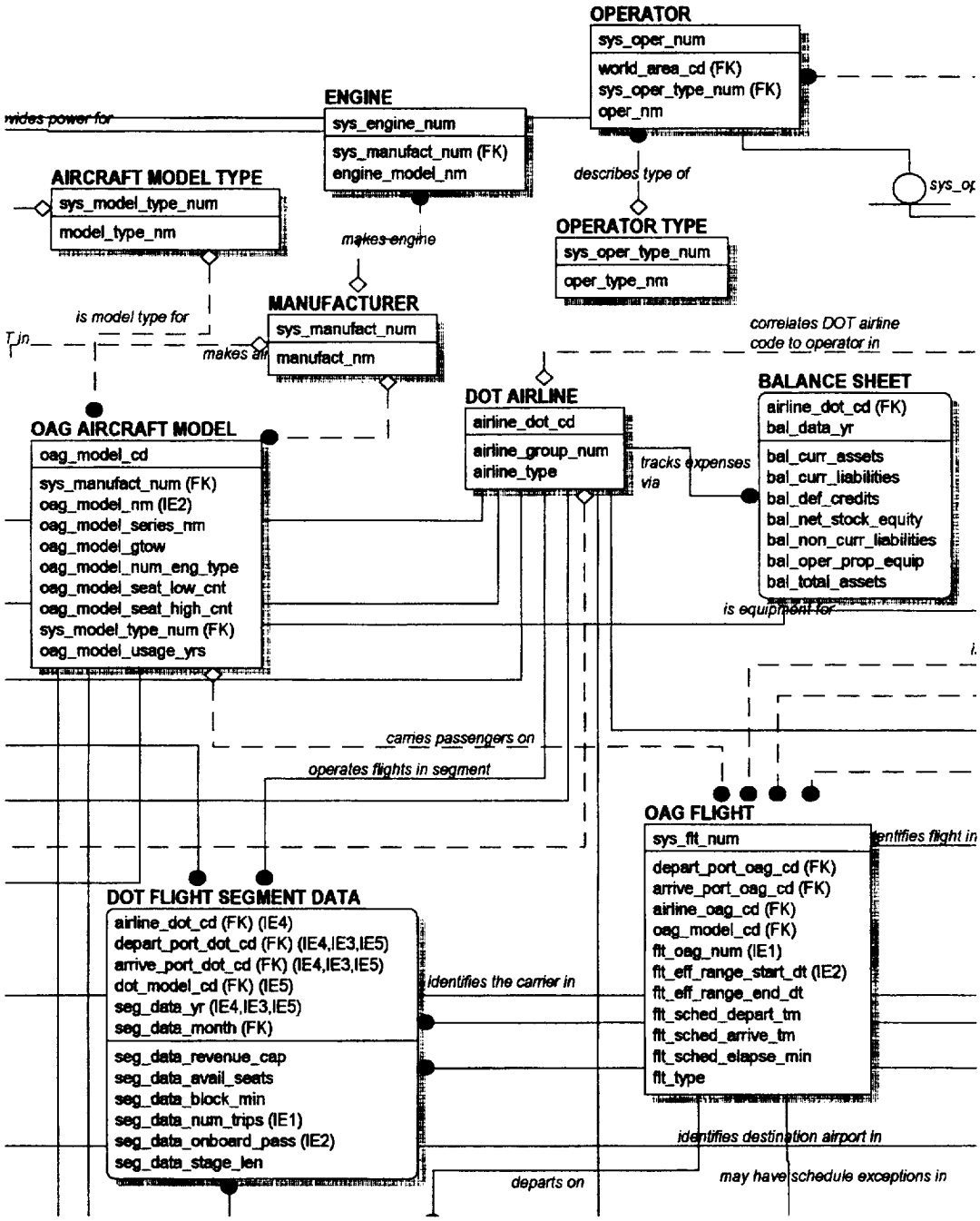


Figure A-2. QRS Database Entity-Relationship Diagram (Continued)

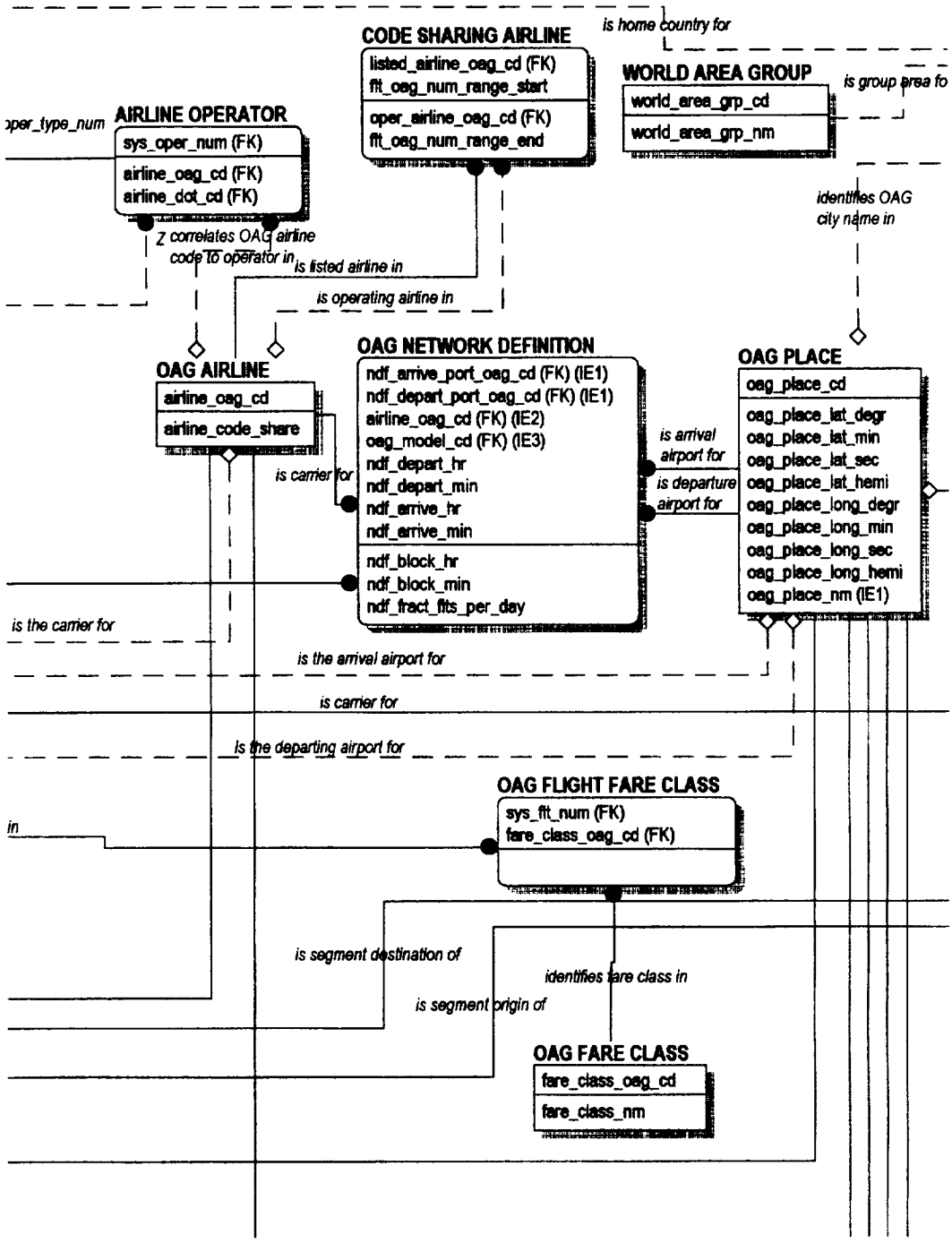


Figure A-2. QRS Database Entity-Relationship Diagram (Continued)

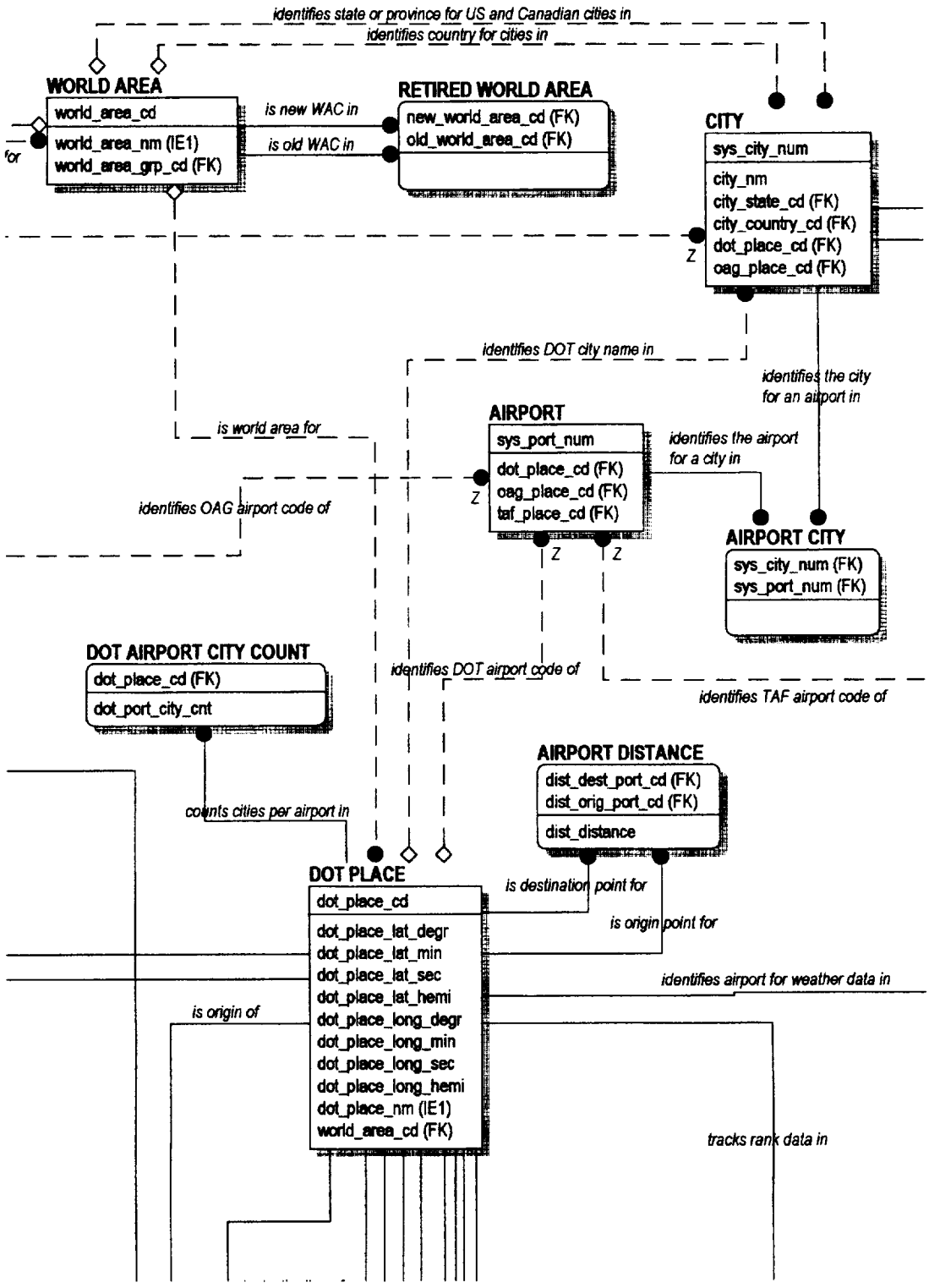


Figure A-2. QRS Database Entity-Relationship Diagram (Continued)

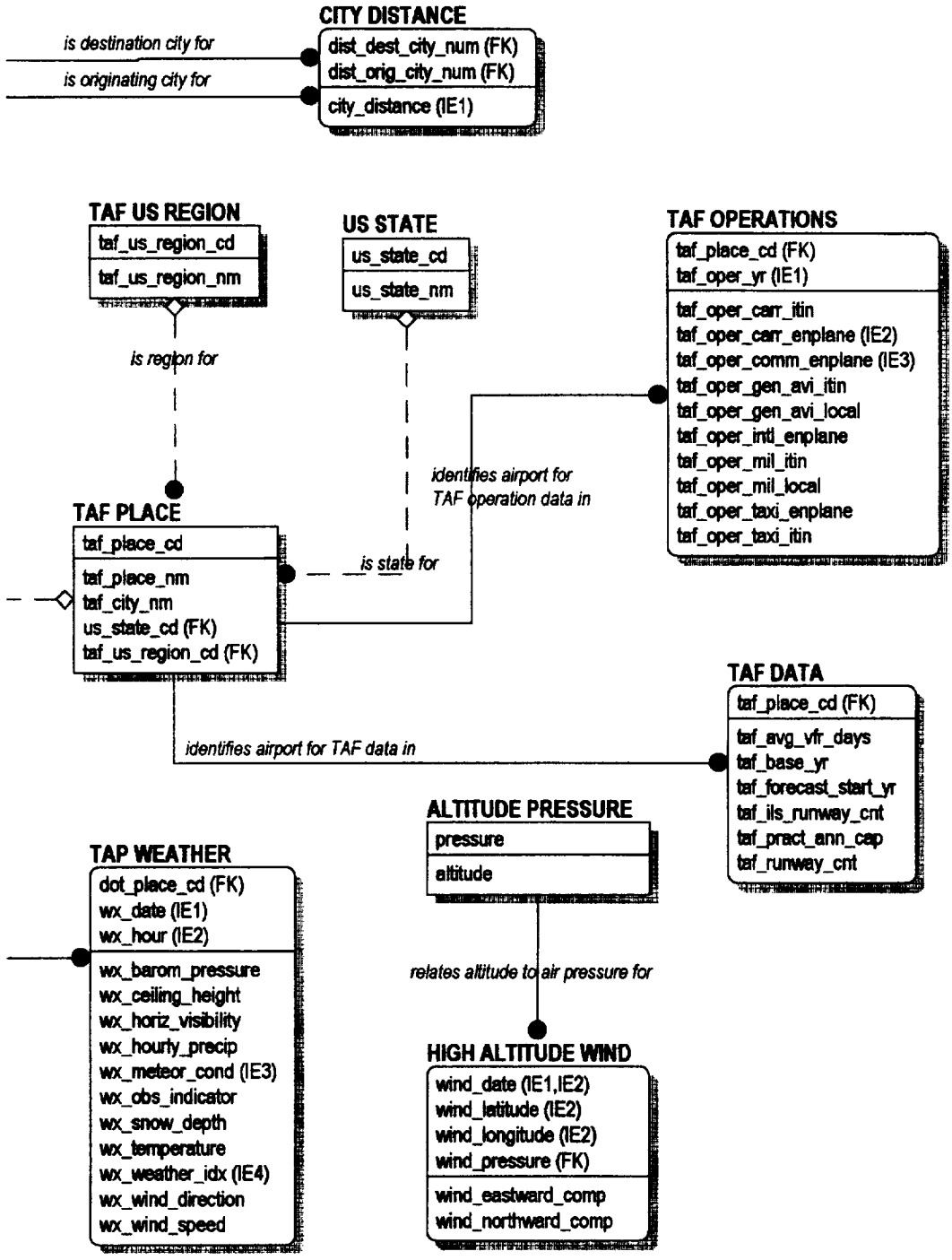


Figure A-2. QRS Database Entity-Relationship Diagram (Continued)

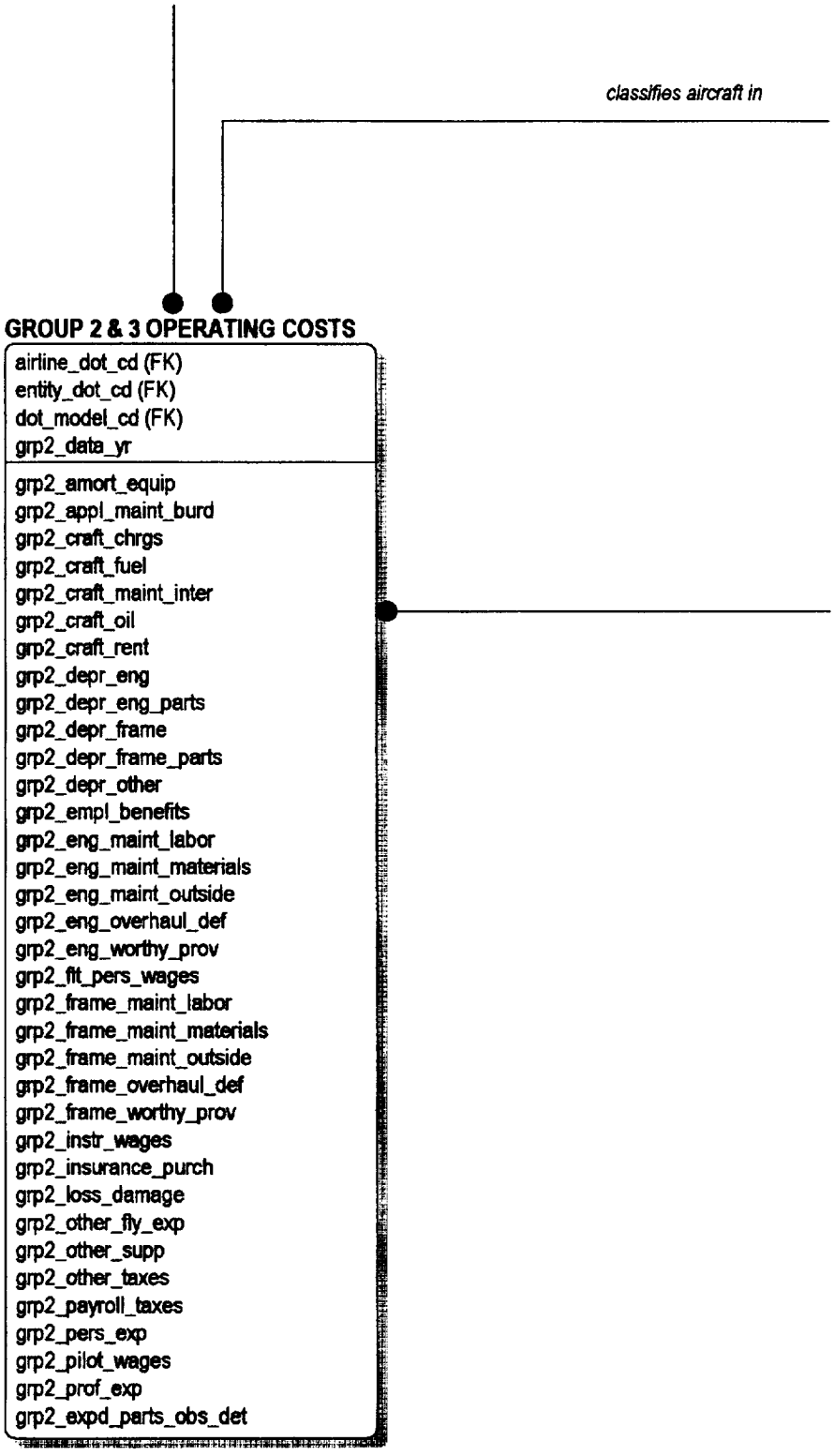


Figure A-2. QRS Database Entity-Relationship Diagram (Continued)

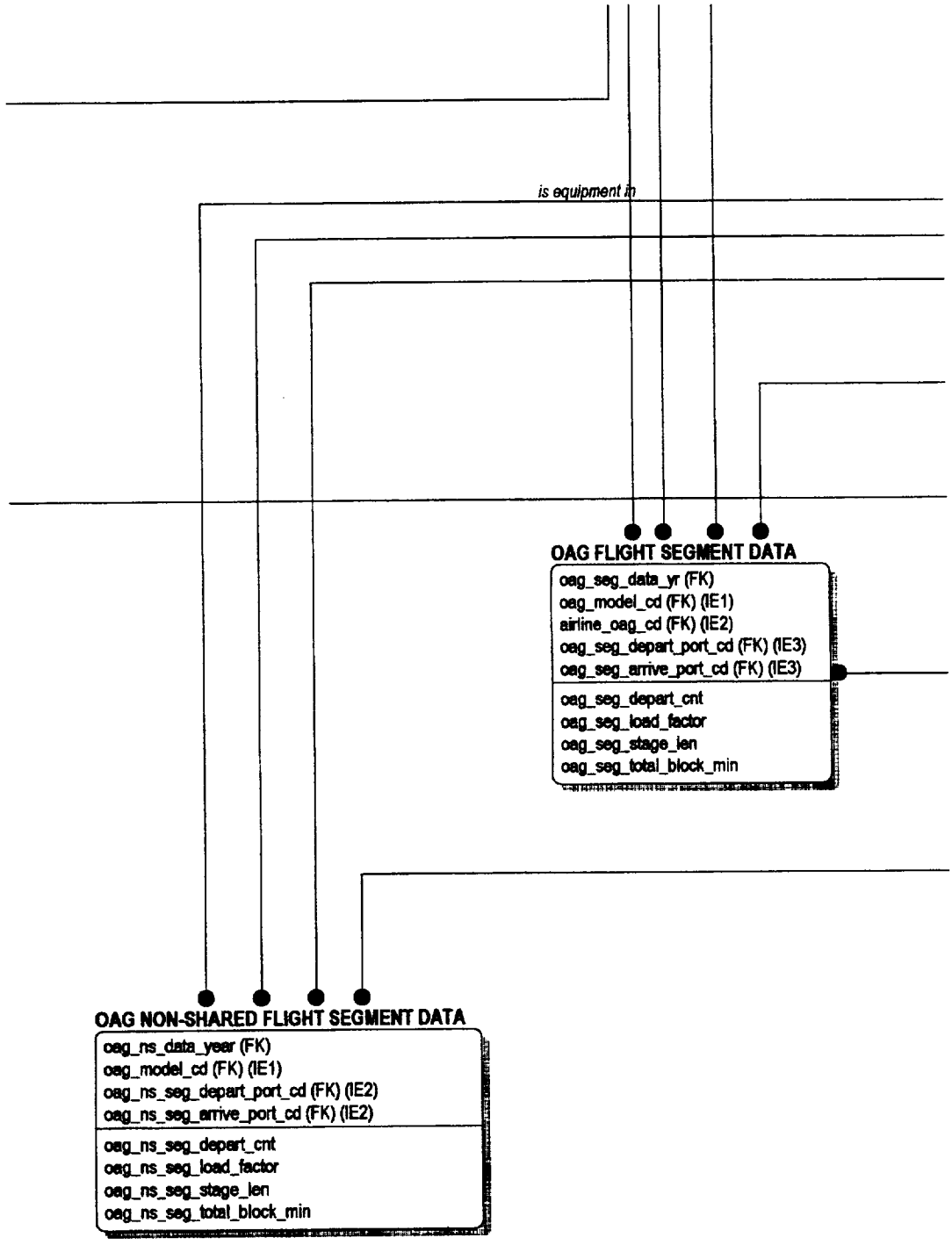


Figure A-2. QRS Database Entity-Relationship Diagram (Continued)

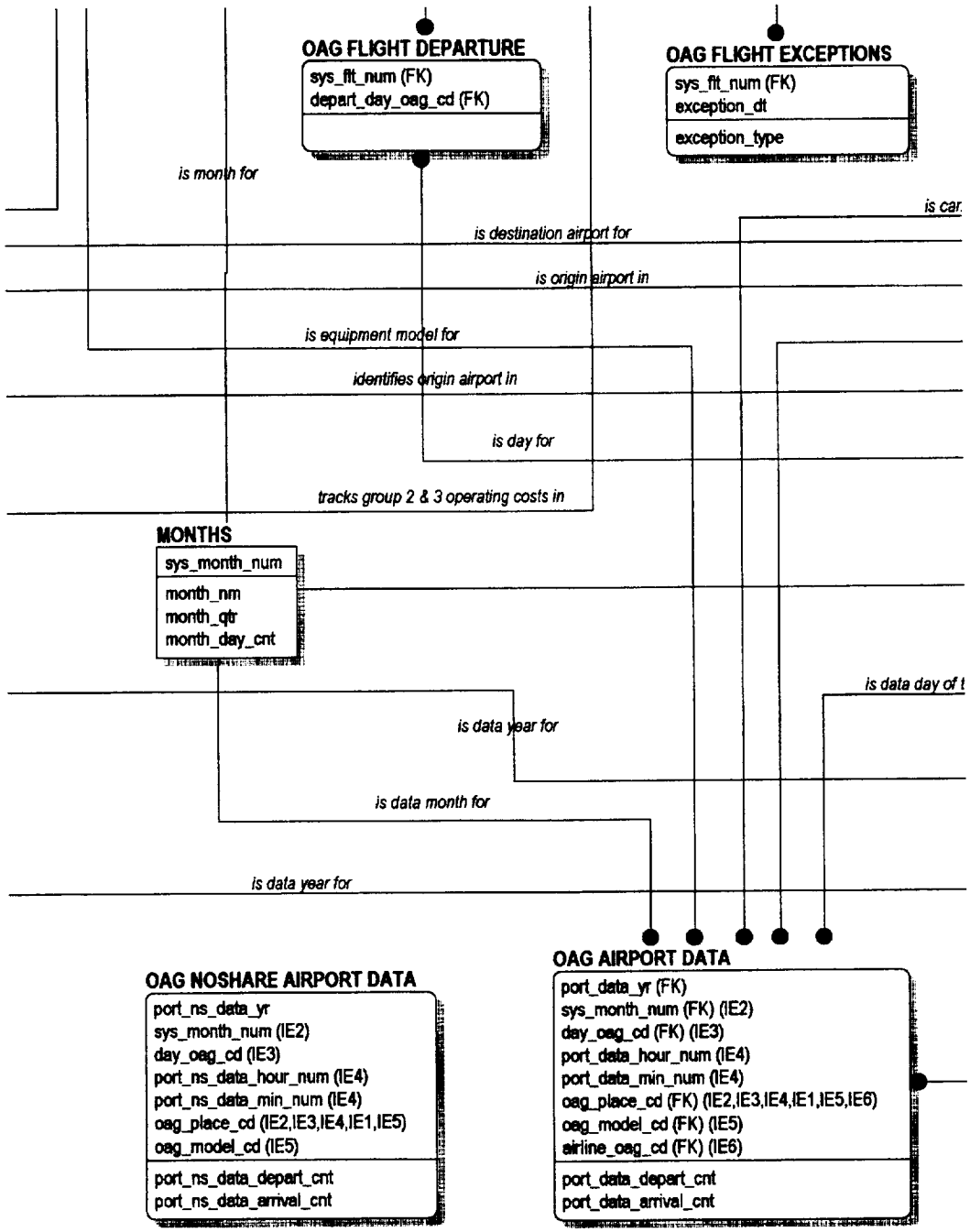


Figure A-2. QRS Database Entity-Relationship Diagram (Continued)

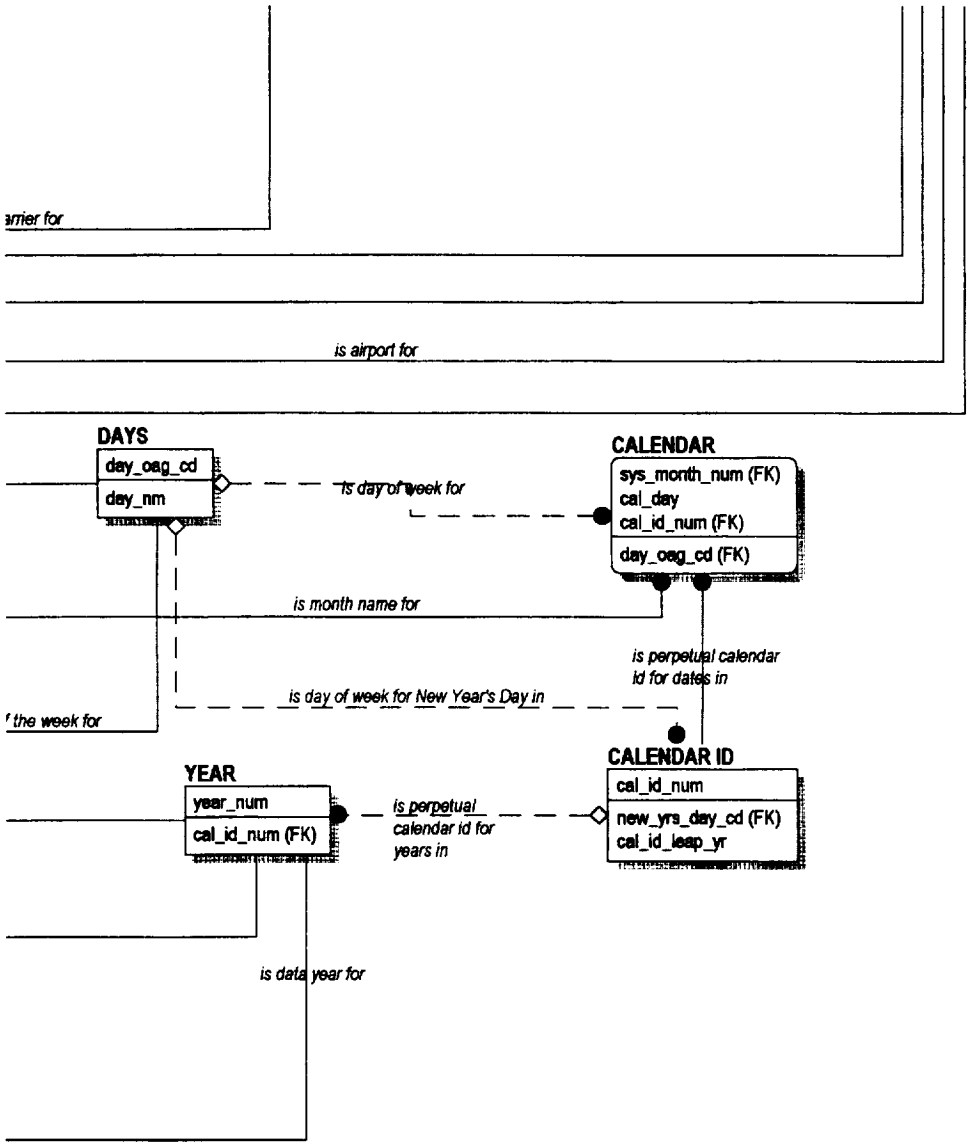


Figure A-2. QRS Database Entity-Relationship Diagram (Continued)

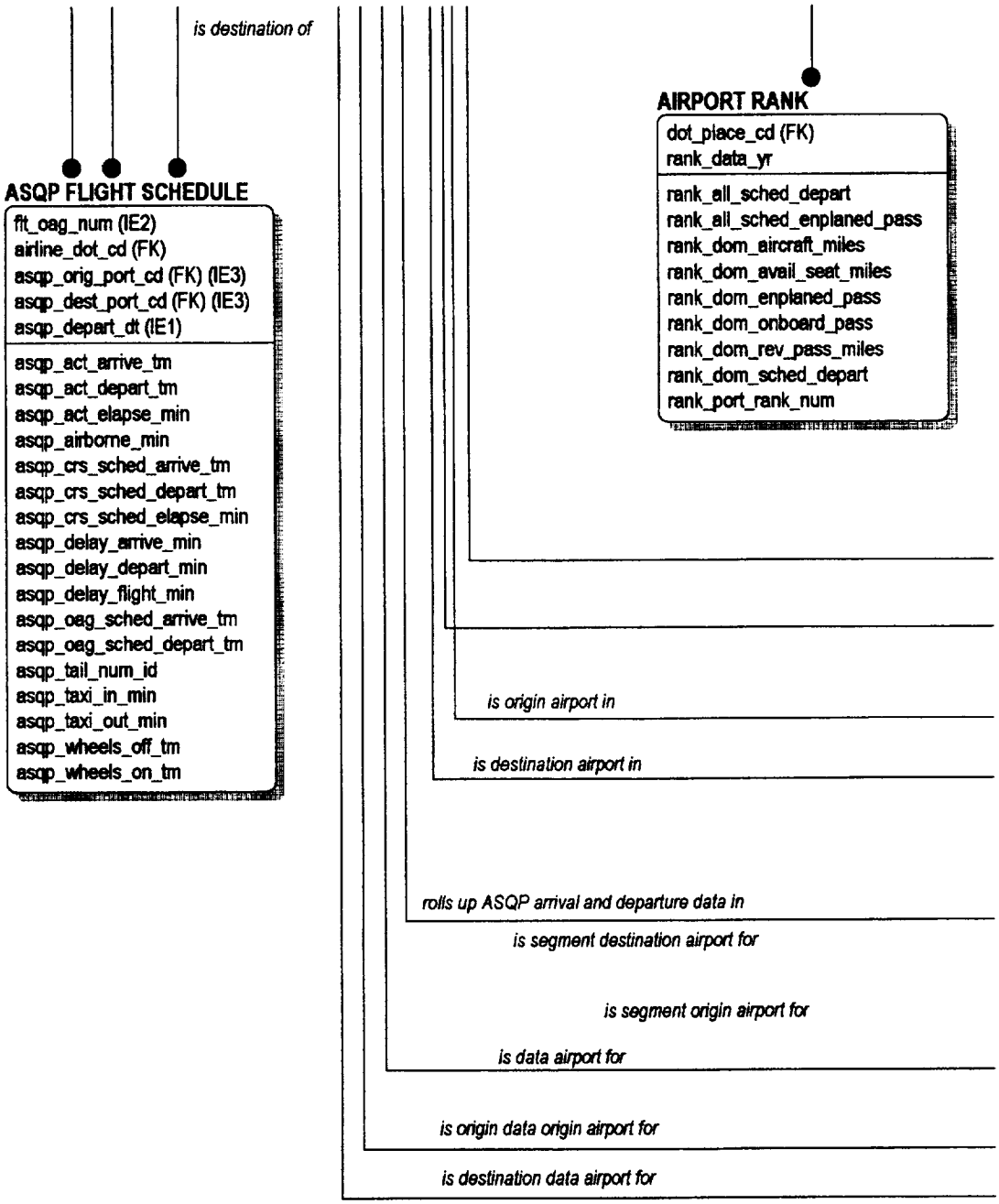
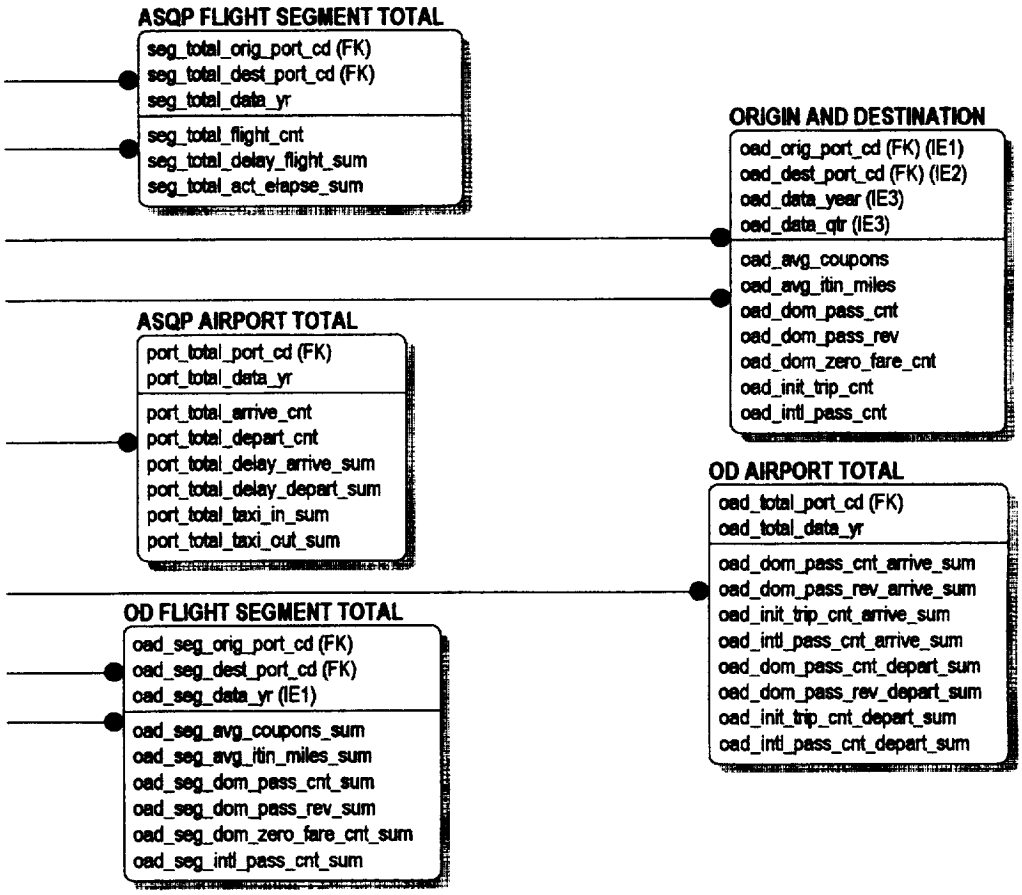
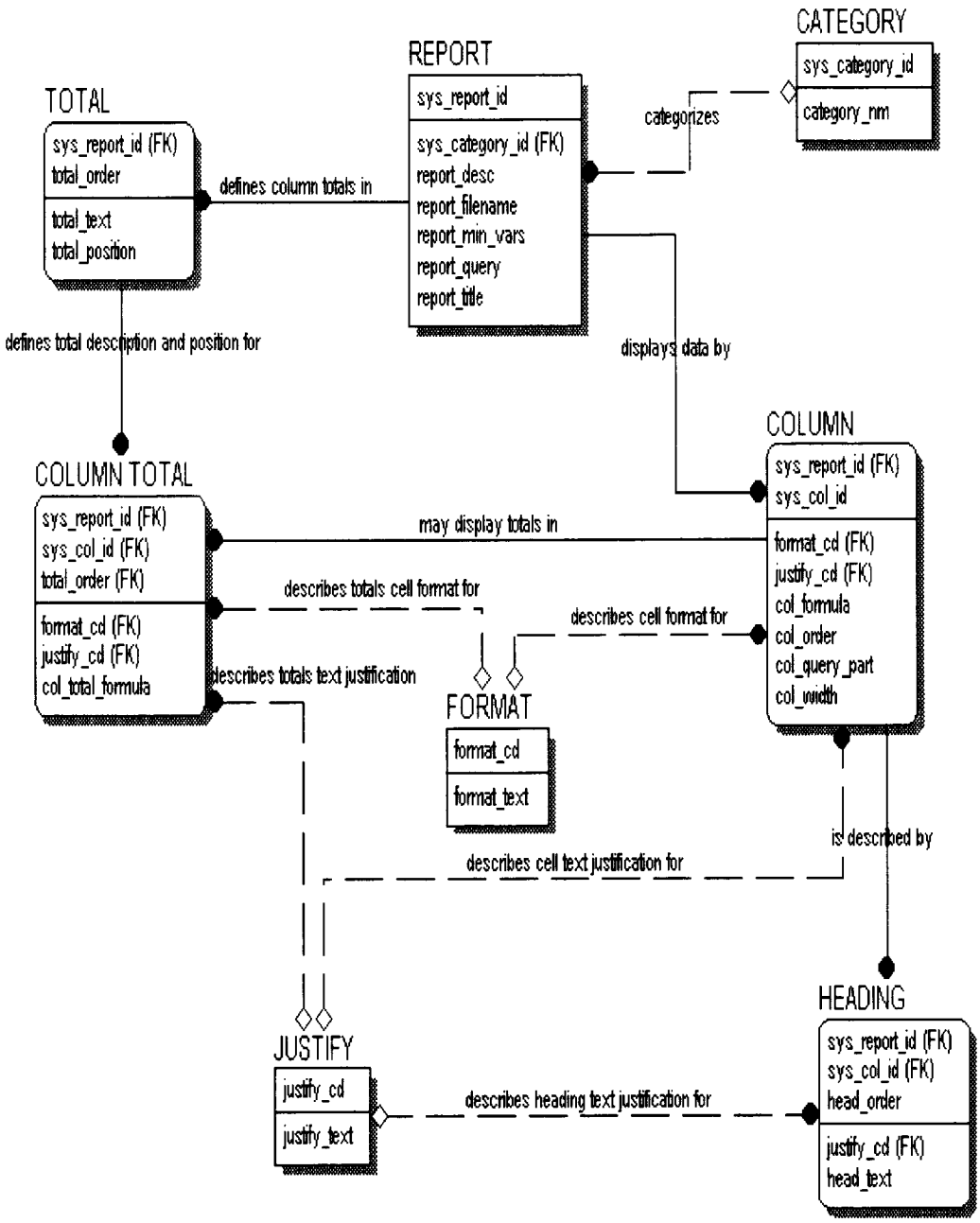


Figure A-2. QRS Database Entity-Relationship Diagram (Continued)



REPORT SPECIFICATION DATABASE ENTITY-RELATIONSHIP DIAGRAM

Figure A-3. Report Specification Database Entity-Relationship Diagram



Appendix B
QRS Model Wizard Web Site Map

INTRODUCTION

Overview

The Model Wizard is part of ASAC's QRS (Quick Response System). It allows for the execution of individual models rather than a series of models in an analysis. The Model Wizard's results are available for downloading using a browser or via FTP.

The ASAC QRS Model Wizard

The ASAC QRS Model Wizard is accessible though the ASAC QRS. The Model Wizard also has a file manager, which allows the user to delete, download, or view existing files in his or her working directory that have been previously created.

From the ASAC QRS Model Wizard, the user currently has direct access to five different ASAC models:

1. Air Carrier Network Cost Model
2. Airport Capacity Model
3. Airport Delay Model
4. Flight Segment Cost Model—Mission Generator
5. Flight Segment Cost Model—Cost Translator.

Additional models will be added to the Model Wizard as they are completed.

Use of This Map

The purpose of this Web site map is to give an overall look at the process involved in using the Model Wizard or individual models. This map allows the user to track his or her progress while either performing an analysis or running an individual model.

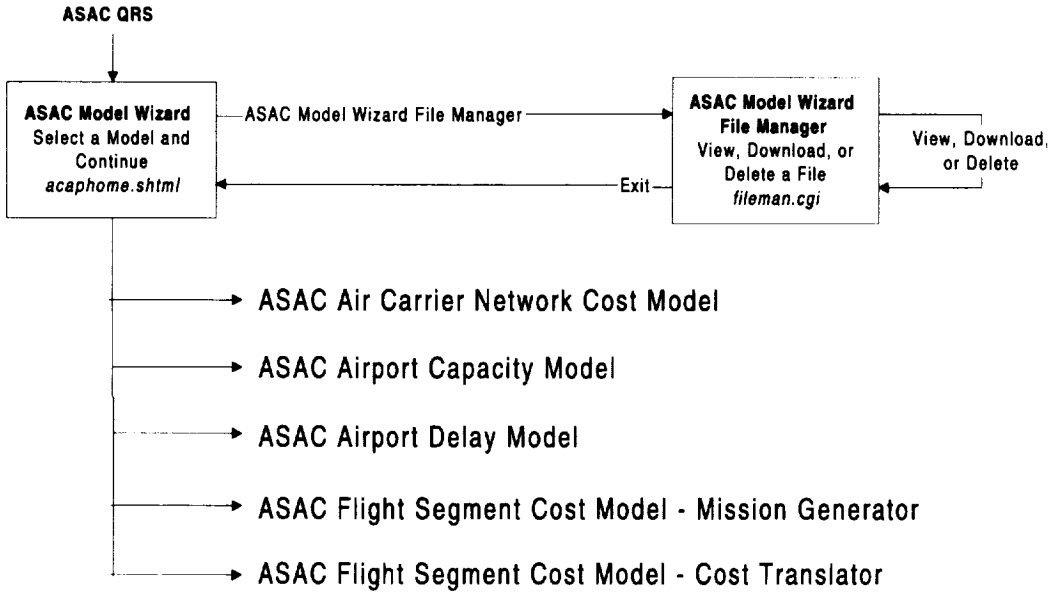
Each box in these maps represent a Web page. Each box has arrows coming into and out of it representing the logical flow though the Web site. The bold text in each box represents the title of the Web page and the italicized text represents the filename that appears in the browser's address window.

The Standard File Upload pages, see Standard File Upload on page B-15, are depicted in the site maps as one box.

SITE MAPS

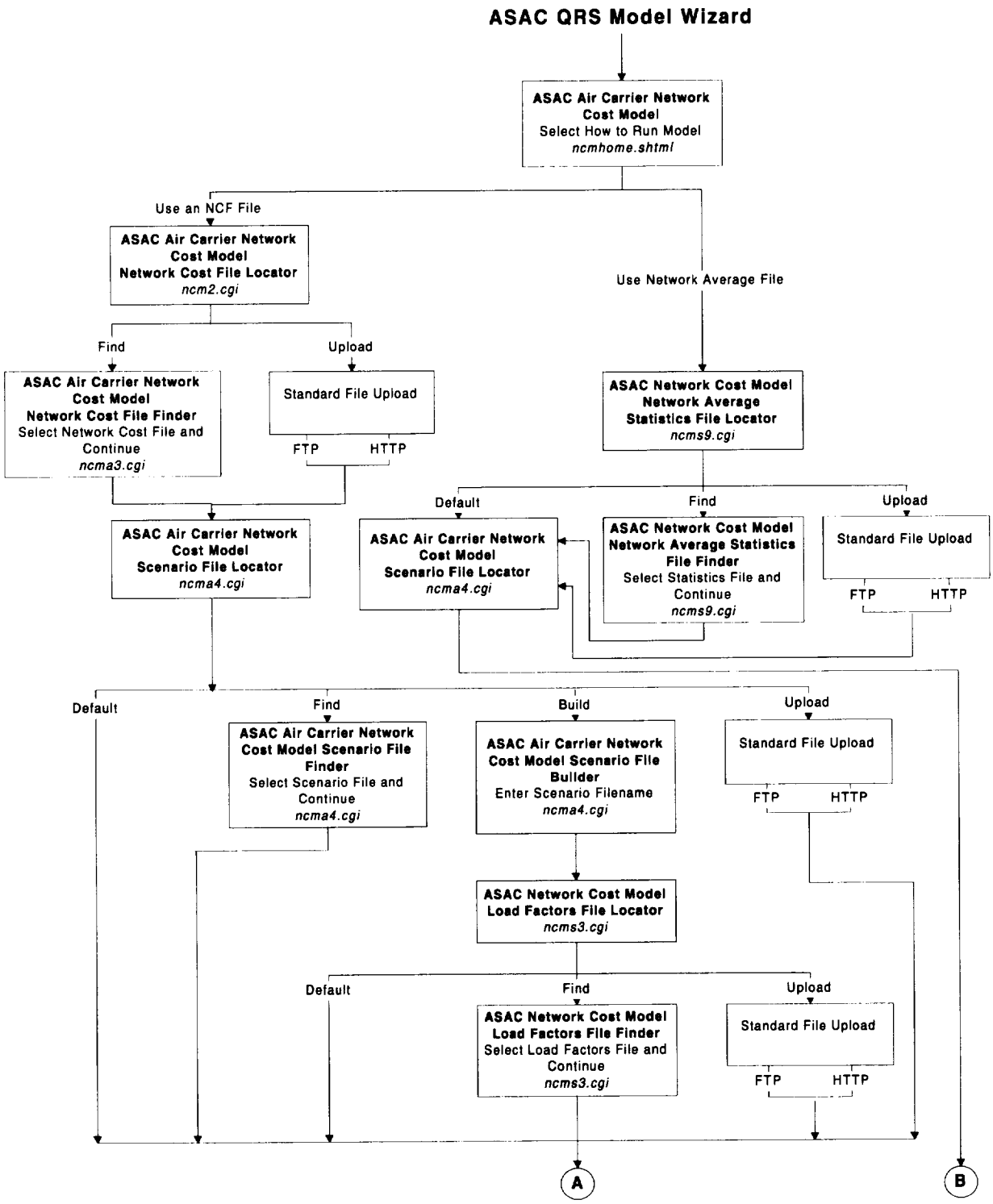
ASAC QRS Model Wizard

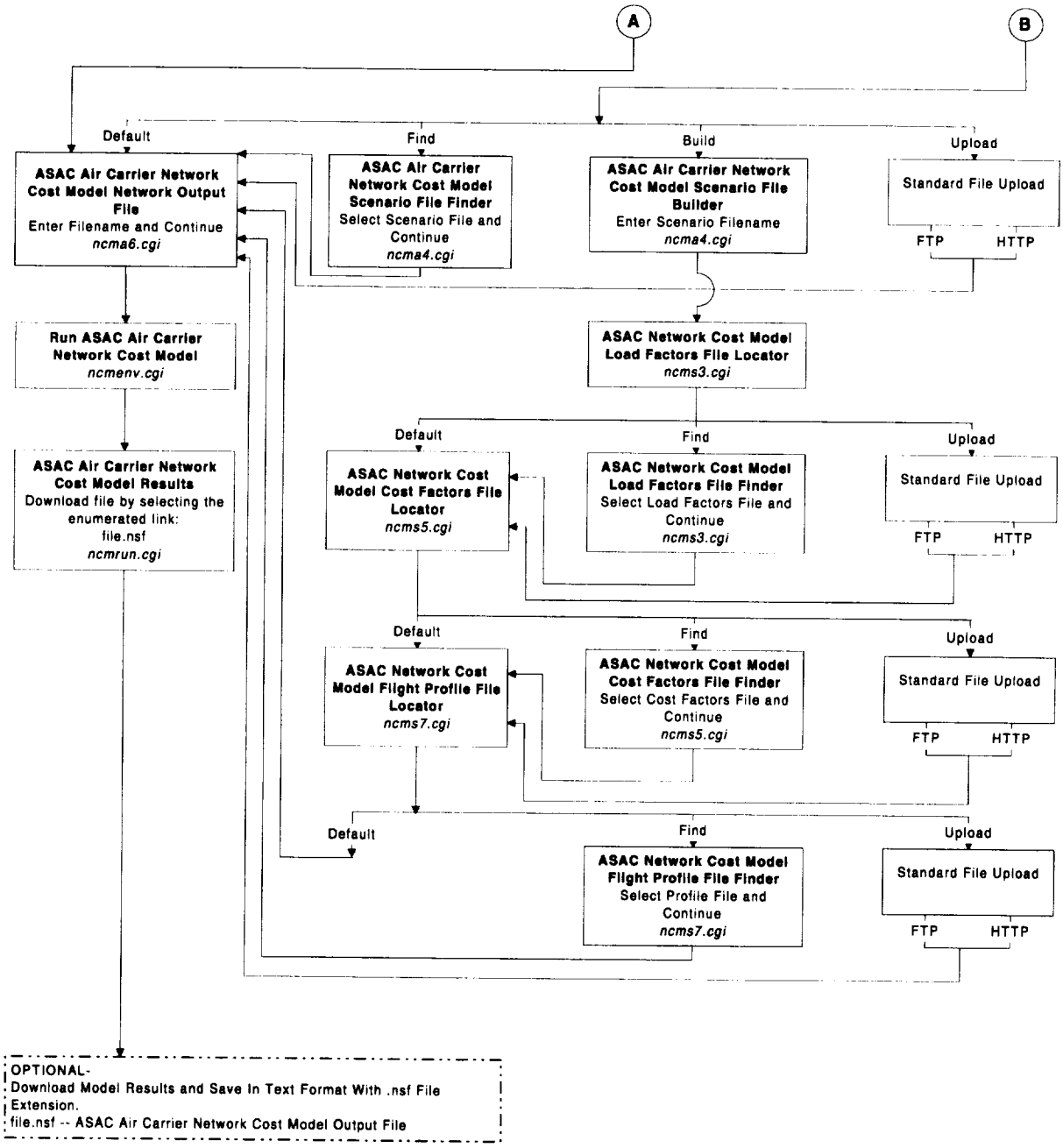
http://www.asac.lmi.org/access/model-wizard/



ASAC Air Carrier Network Cost Model

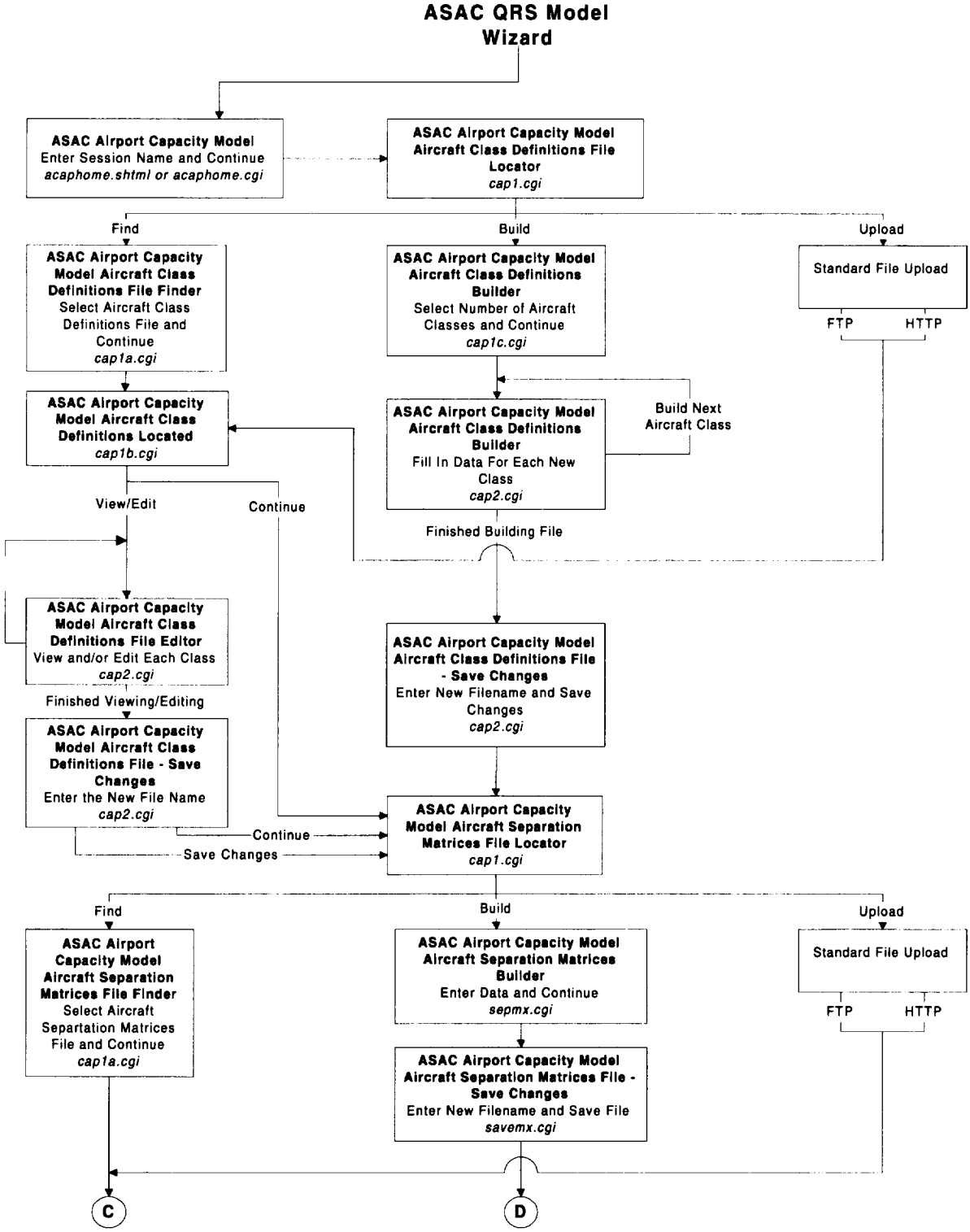
http://www.asac.lmi.org/access/model-wizard/ncmhome.shtml

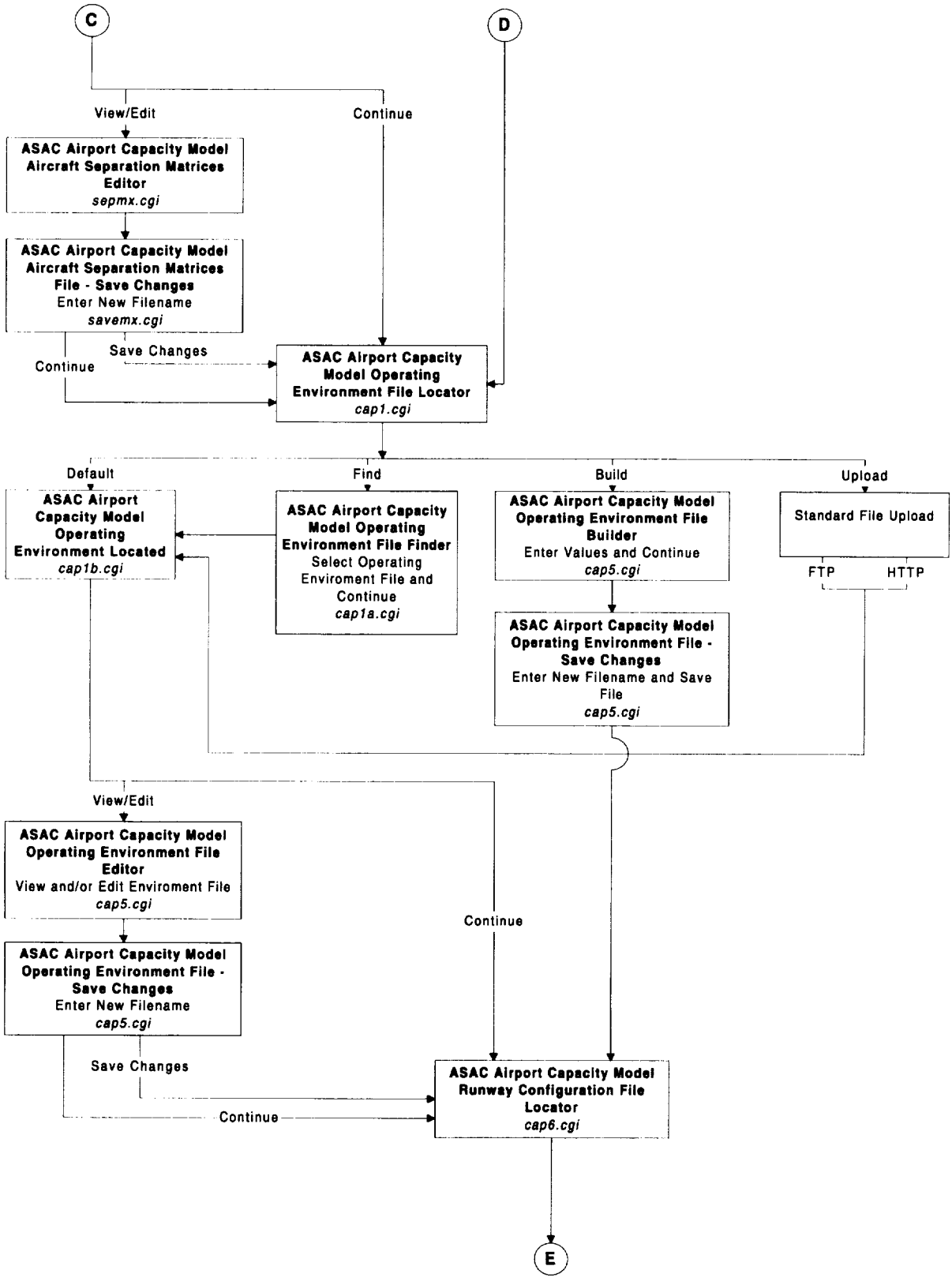


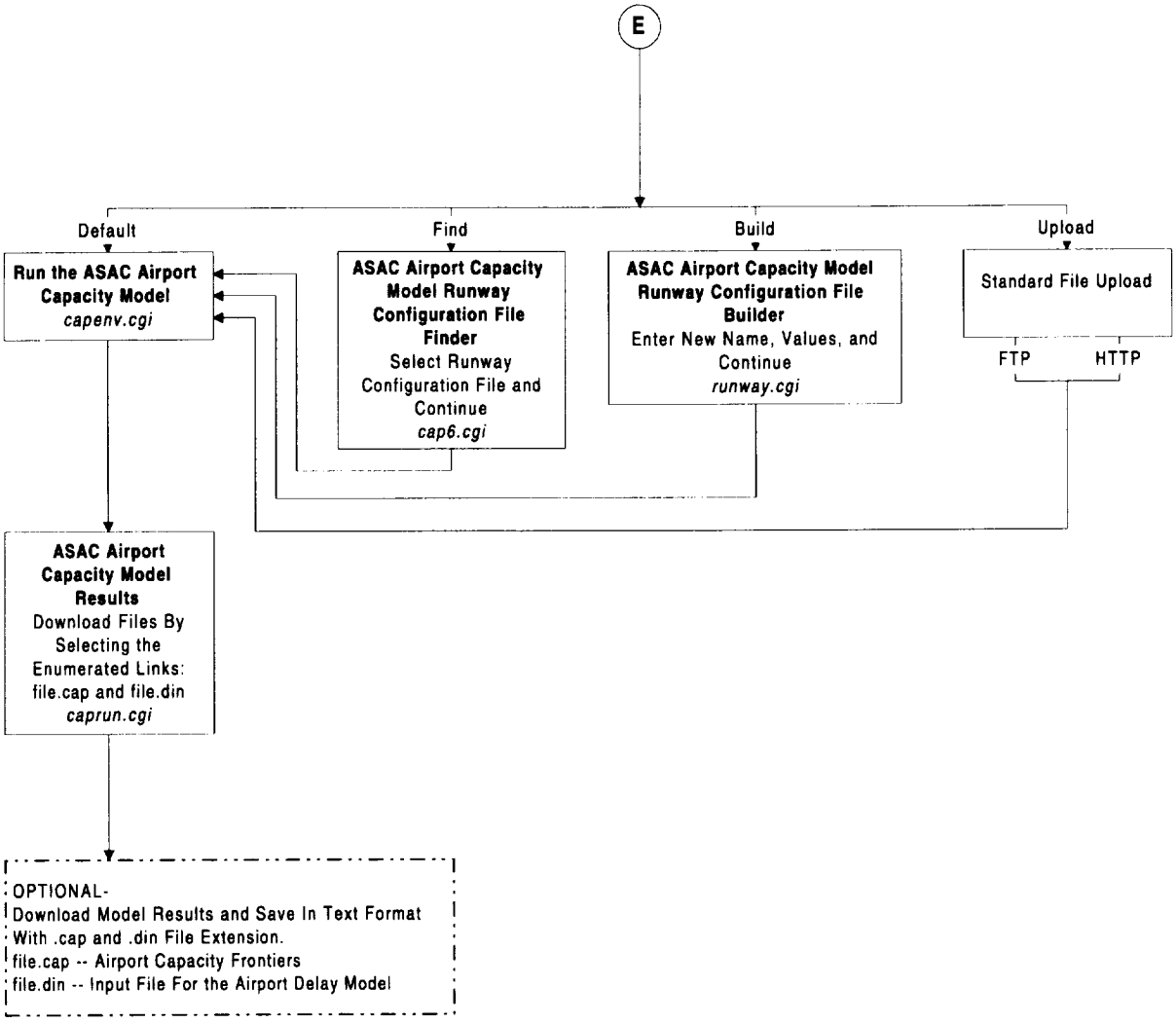

A
B
Default
Find
Build
Upload
ASAC Air Carrier Network Cost Model Network Output File
Enter Filename and Continue
ncma6.cgi
ASAC Air Carrier Network Cost Model Scenario File Finder
Select Scenario File and Continue
ncma4.cgi
ASAC Air Carrier Network Cost Model Scenario File Builder
Enter Scenario Filename
ncma4.cgi
Standard File Upload
FTP
HTTP
Run ASAC Air Carrier Network Cost Model
ncmenv.cgi
ASAC Network Cost Model Load Factors File Locator
ncms3.cgi
ASAC Air Carrier Network Cost Model Results
Download file by selecting the enumerated link:
file.nsf
ncmrun.cgi
ASAC Network Cost Model Cost Factors File Locator
ncms5.cgi
ASAC Network Cost Model Load Factors File Finder
Select Load Factors File and Continue
ncms3.cgi
ASAC Network Cost Model Flight Profile File Locator
ncms7.cgi
ASAC Network Cost Model Cost Factors File Finder
Select Cost Factors File and Continue
ncms5.cgi
ASAC Network Cost Model Flight Profile File Finder
Select Profile File and Continue
ncms7.cgi
OPTIONAL-
Download Model Results and Save In Text Format With .nsf File Extension.
file.nsf -- ASAC Air Carrier Network Cost Model Output File

ASAC Airport Capacity Model

http://www.asac.lmi.org/access/model-wizard/acaphome.shtml

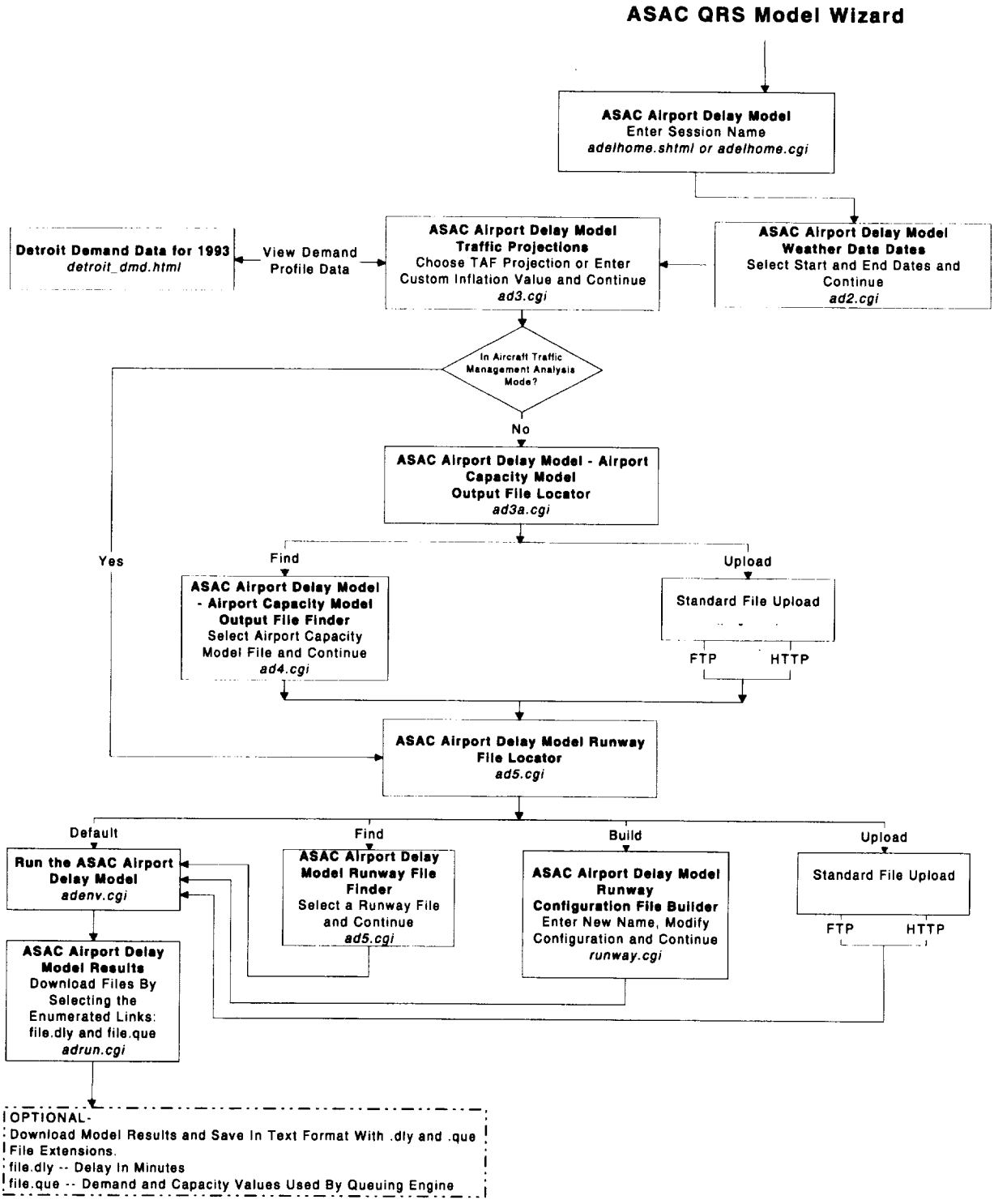



C
D
View/Edit
Continue
ASAC Airport Capacity Model Aircraft Separation Matrices Editor
sepmx.cgi
ASAC Airport Capacity Model Aircraft Separation Matrices File - Save Changes
Enter New Filename
savemx.cgi
Continue
Save Changes
ASAC Airport Capacity Model Operating Environment File Locator
cap1.cgi
Default
Find
Build
Upload
ASAC Airport Capacity Model Operating Environment Located
cap1b.cgi
ASAC Airport Capacity Model Operating Environment File Finder
Select Operating Enviroment File and Continue
cap1a.cgi
ASAC Airport Capacity Model Operating Environment File Builder
Enter Values and Continue
cap5.cgi
Standard File Upload
FTP
HTTP
ASAC Airport Capacity Model Operating Environment File - Save Changes
Enter New Filename and Save File
cap5.cgi
View/Edit
ASAC Airport Capacity Model Operating Environment File Editor
View and/or Edit Enviroment File
cap5.cgi
Continue
ASAC Airport Capacity Model Operating Environment File - Save Changes
Enter New Filename
cap5.cgi
Save Changes
Continue
ASAC Airport Capacity Model Runway Configuration File Locator
cap6.cgi
E


E
Default
Find
Build
Upload
Run the ASAC Airport Capacity Model
capenv.cgi
ASAC Airport Capacity Model Runway Configuration File Finder
Select Runway Configuration File and Continue
cap6.cgi
ASAC Airport Capacity Model Runway Configuration File Builder
Enter New Name, Values, and Continue
runway.cgi
Standard File Upload
FTP
HTTP
ASAC Airport Capacity Model Results
Download Files By Selecting the Enumerated Links: file.cap and file.din
caprun.cgi
OPTIONAL-
Download Model Results and Save In Text Format With .cap and .din File Extension.
file.cap -- Airport Capacity Frontiers
file.din -- Input File For the Airport Delay Model

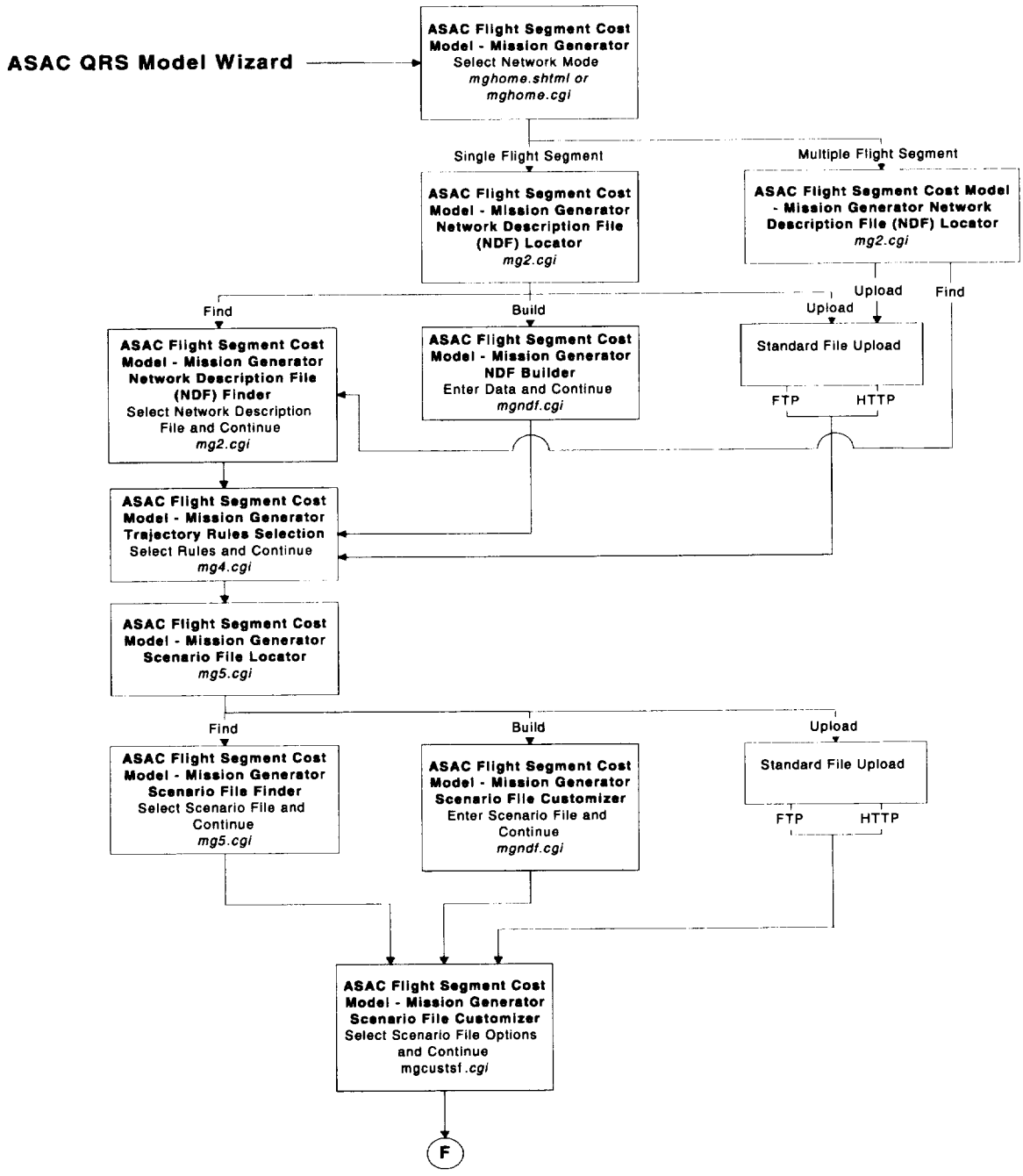
ASAC Airport Delay Model

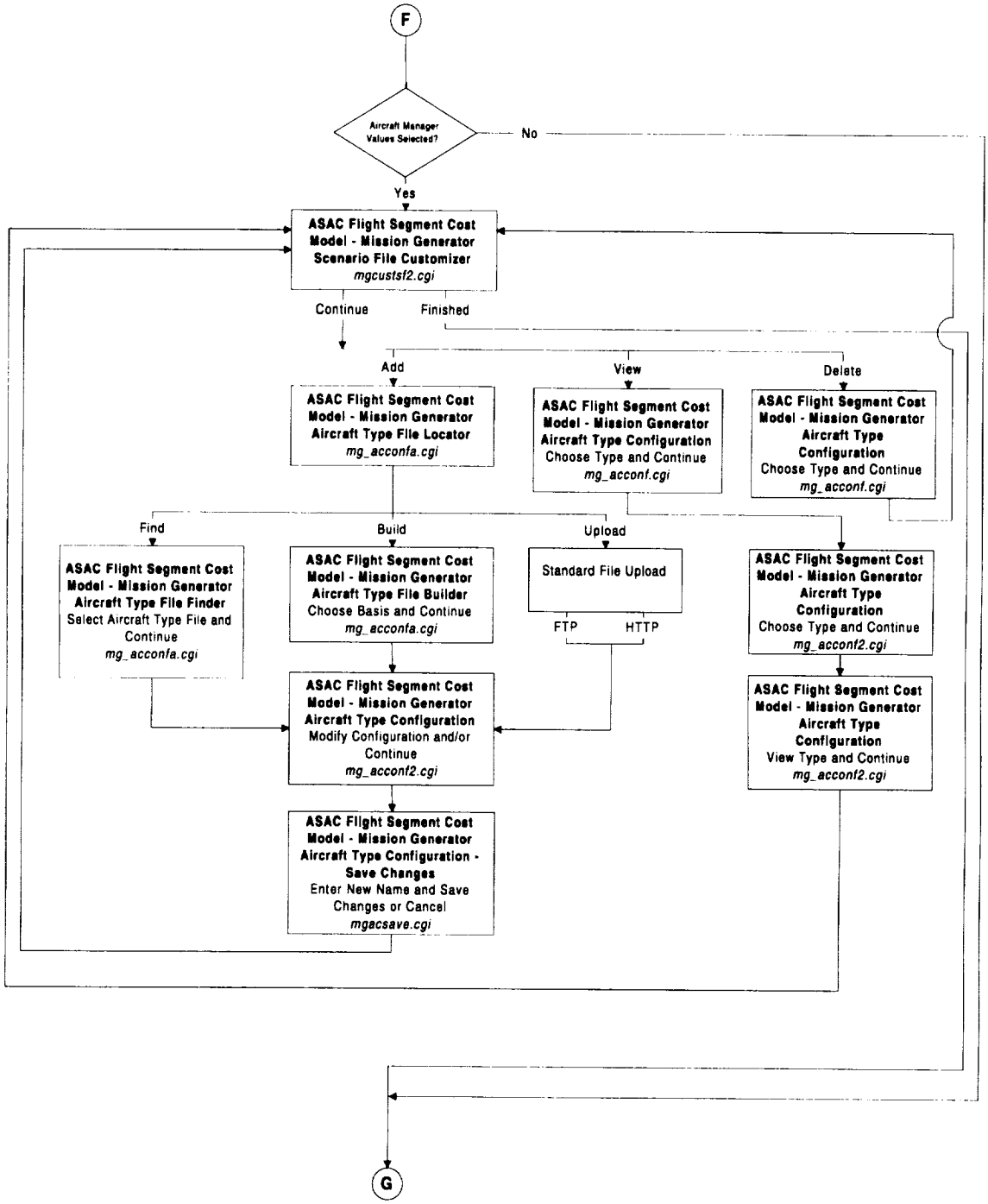
http://www.asac.lmi.org/access/model-wizard/adelhome.shtml

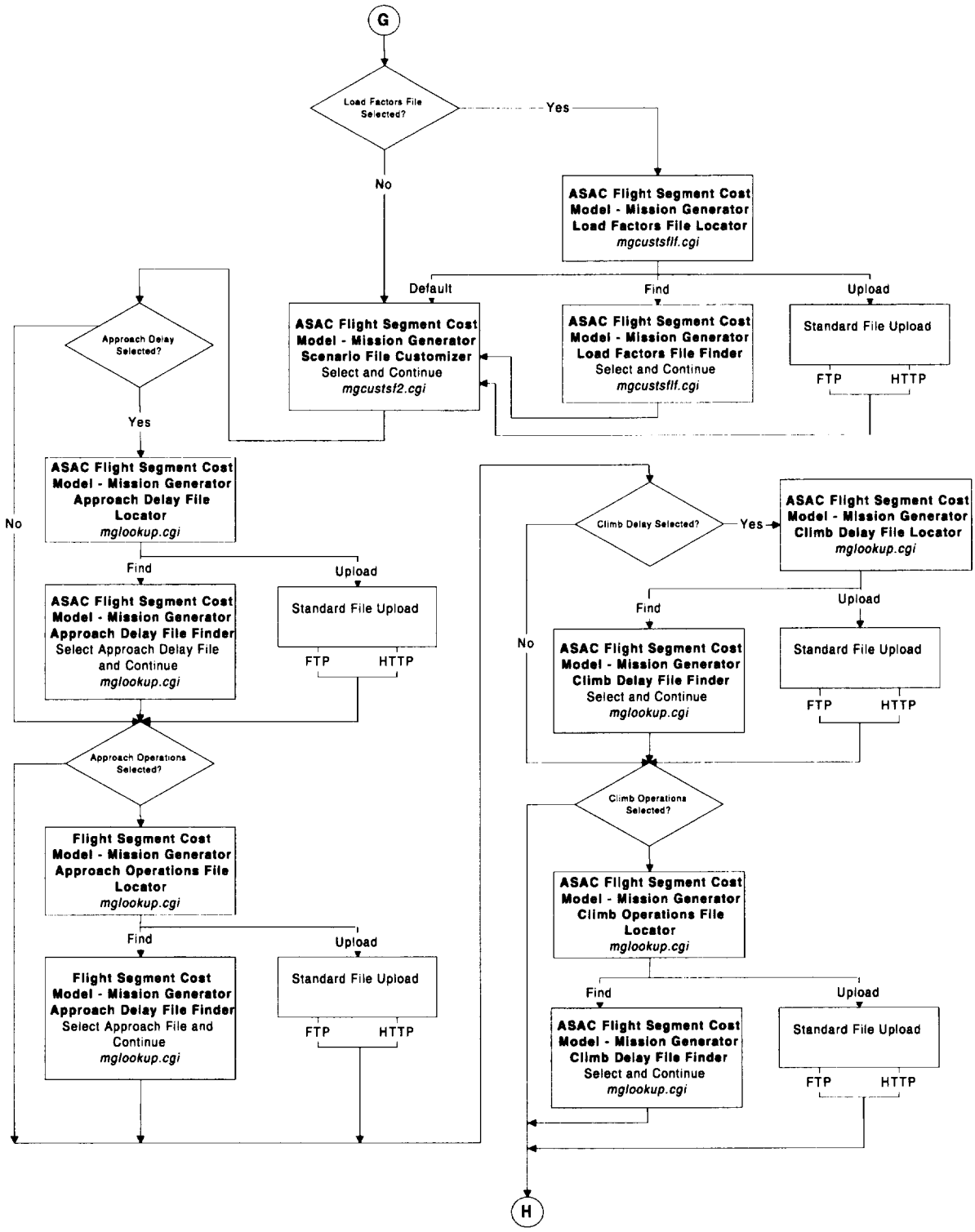


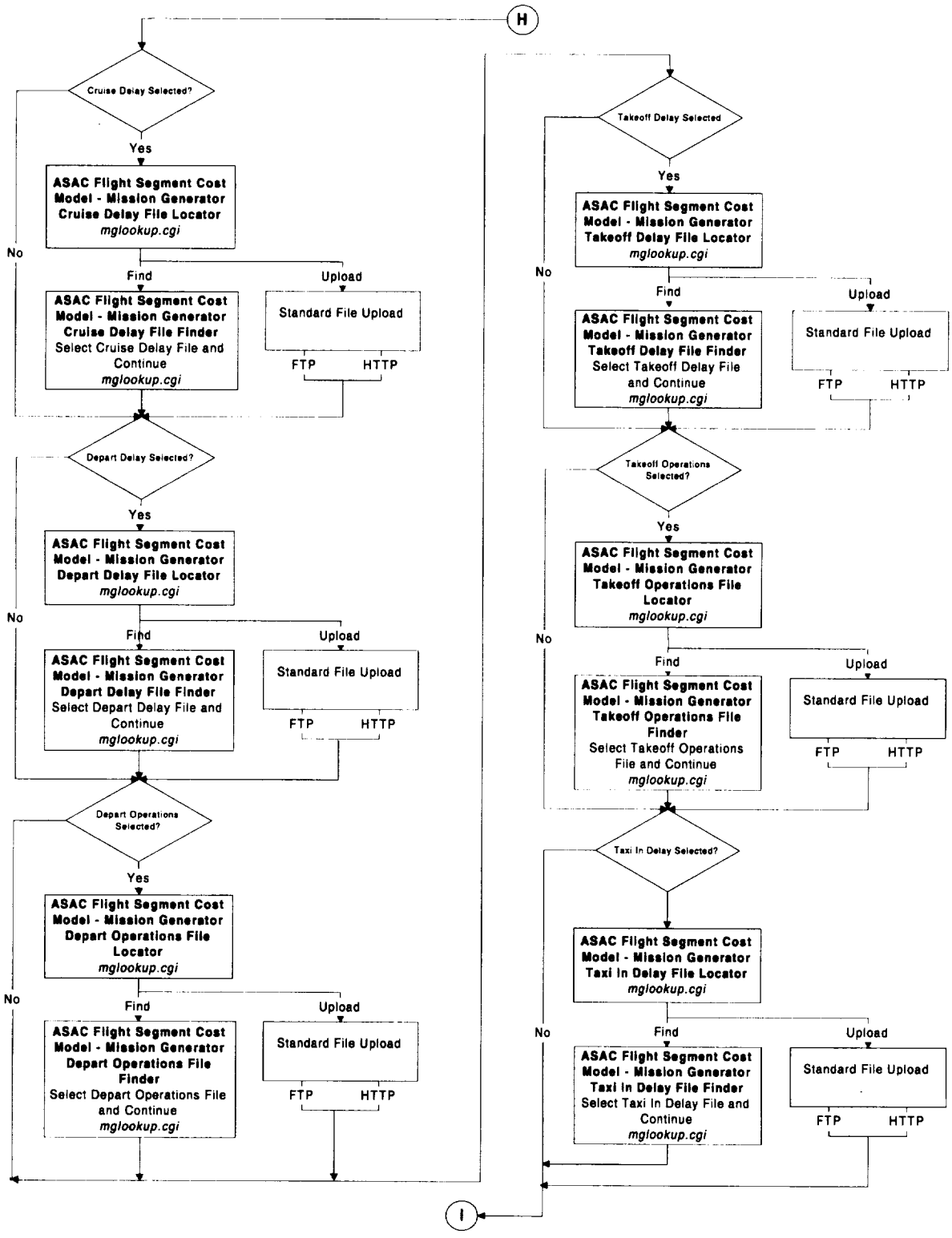
ASAC Flight Segment Cost Model - Mission Generator

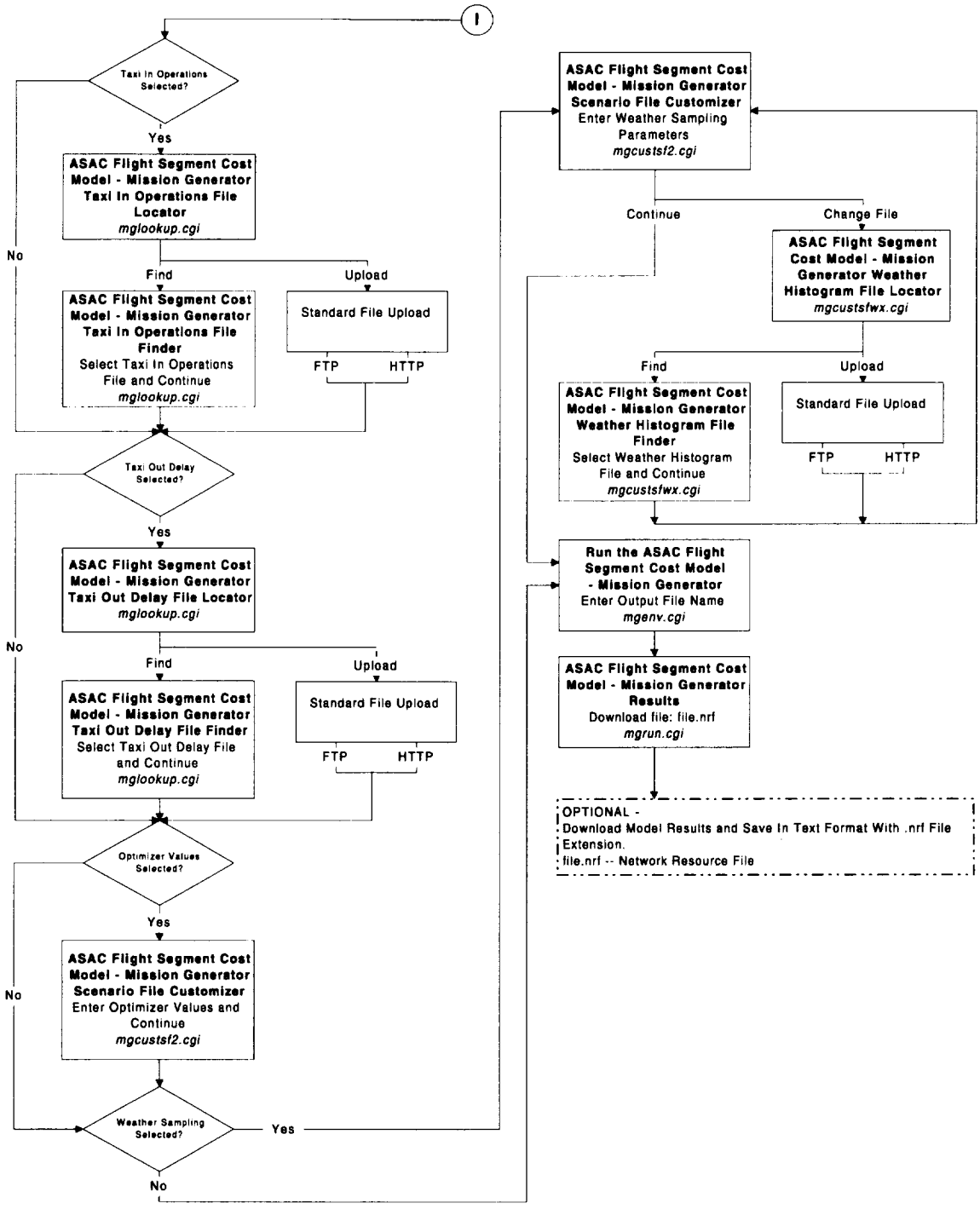
http://www.asac.lmi.org/access/model-wizard/mghome.shtml




F
Aircraft Manager Values Selected?
No
Yes
ASAC Flight Segment Cost Model - Mission Generator Scenario File Customizer
mgcustsf2.cgi
Continue
Finished
Add
View
Delete
ASAC Flight Segment Cost Model - Mission Generator Aircraft Type File Locator
mg_acconfa.cgi
ASAC Flight Segment Cost Model - Mission Generator Aircraft Type Configuration
Choose Type and Continue
mg_acconf.cgi
ASAC Flight Segment Cost Model - Mission Generator Aircraft Type Configuration
Choose Type and Continue
mg_acconf.cgi
Find
Build
Upload
ASAC Flight Segment Cost Model - Mission Generator Aircraft Type File Finder
Select Aircraft Type File and Continue
mg_acconfa.cgi
ASAC Flight Segment Cost Model - Mission Generator Aircraft Type File Builder
Choose Basis and Continue
mg_acconfa.cgi
Standard File Upload
FTP
HTTP
ASAC Flight Segment Cost Model - Mission Generator Aircraft Type Configuration
Choose Type and Continue
mg_acconf2.cgi
ASAC Flight Segment Cost Model - Mission Generator Aircraft Type Configuration
Modify Configuration and/or Continue
mg_acconf2.cgi
ASAC Flight Segment Cost Model - Mission Generator Aircraft Type Configuration
View Type and Continue
mg_acconf2.cgi
ASAC Flight Segment Cost Model - Mission Generator Aircraft Type Configuration - Save Changes
Enter New Name and Save Changes or Cancel
mgacsave.cgi
G

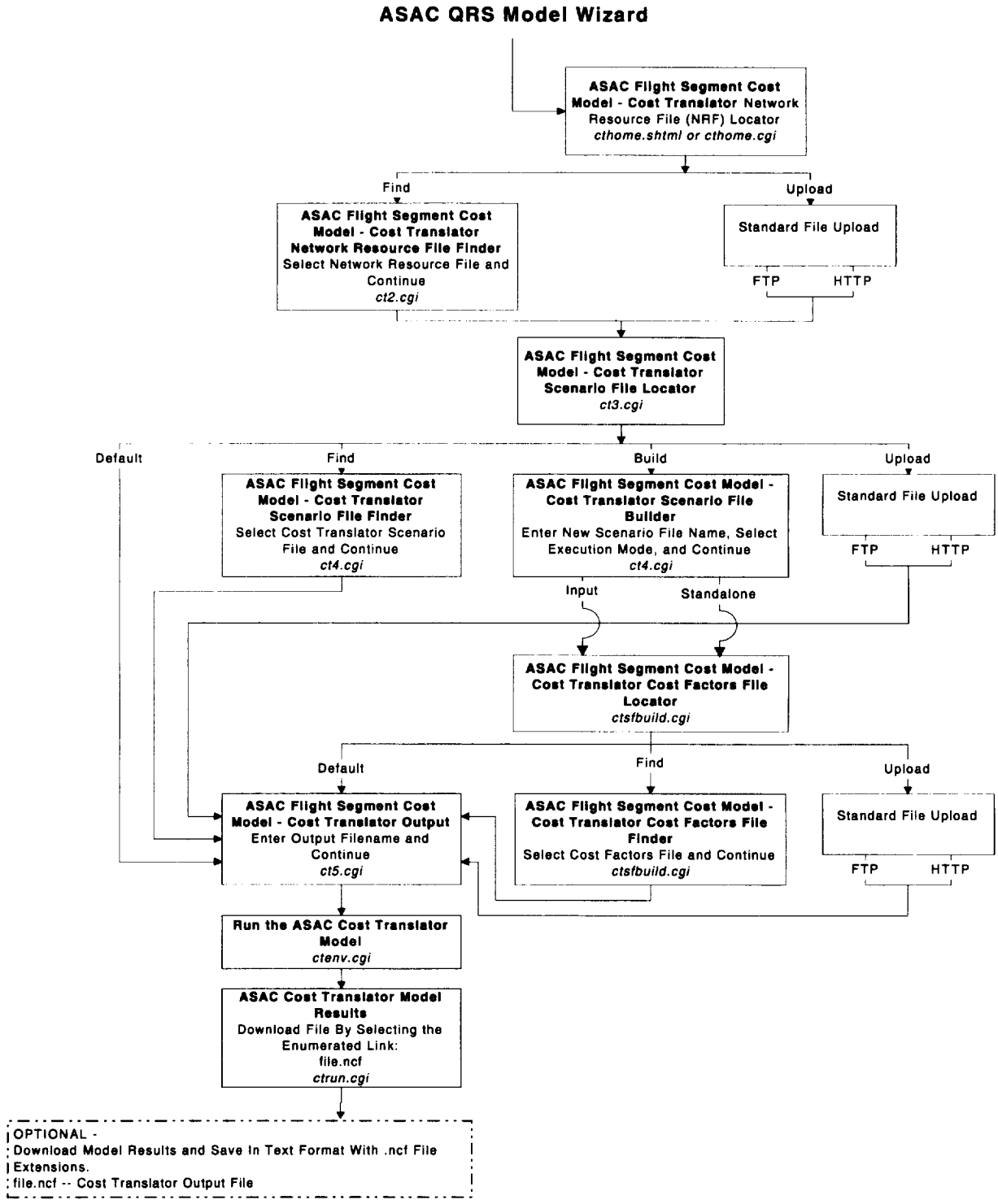

G
Load Factors File Selected?
Yes
No
ASAC Flight Segment Cost Model - Mission Generator Load Factors File Locator
mgcustsflf.cgi
Default
Find
Upload
ASAC Flight Segment Cost Model - Mission Generator Scenario File Customizer
Select and Continue
mgcustsf2.cgi
ASAC Flight Segment Cost Model - Mission Generator Load Factors File Finder
Select and Continue
mgcustsflf.cgi
Standard File Upload
FTP
HTTP
Approach Delay Selected?
Yes
No
ASAC Flight Segment Cost Model - Mission Generator Approach Delay File Locator
mglookup.cgi
Find
Upload
ASAC Flight Segment Cost Model - Mission Generator Approach Delay File Finder
Select Approach Delay File and Continue
mglookup.cgi
Standard File Upload
FTP
HTTP
Approach Operations Selected?
Flight Segment Cost Model - Mission Generator Approach Operations File Locator
mglookup.cgi
Find
Upload
Flight Segment Cost Model - Mission Generator Approach Delay File Finder
Select Approach File and Continue
mglookup.cgi
Standard File Upload
FTP
HTTP
Climb Delay Selected?
Yes
No
ASAC Flight Segment Cost Model - Mission Generator Climb Delay File Locator
mglookup.cgi
Find
Upload
ASAC Flight Segment Cost Model - Mission Generator Climb Delay File Finder
Select and Continue
mglookup.cgi
Standard File Upload
FTP
HTTP
Climb Operations Selected?
ASAC Flight Segment Cost Model - Mission Generator Climb Operations File Locator
mglookup.cgi
Find
Upload
ASAC Flight Segment Cost Model - Mission Generator Climb Delay File Finder
Select and Continue
mglookup.cgi
Standard File Upload
FTP
HTTP
H


H
Cruise Delay Selected?
Yes
No
ASAC Flight Segment Cost Model - Mission Generator Cruise Delay File Locator
mglookup.cgi
Find
Upload
ASAC Flight Segment Cost Model - Mission Generator Cruise Delay File Finder
Select Cruise Delay File and Continue
mglookup.cgi
Standard File Upload
FTP
HTTP
Depart Delay Selected?
Yes
No
ASAC Flight Segment Cost Model - Mission Generator Depart Delay File Locator
mglookup.cgi
Find
Upload
ASAC Flight Segment Cost Model - Mission Generator Depart Delay File Finder
Select Depart Delay File and Continue
mglookup.cgi
Standard File Upload
FTP
HTTP
Depart Operations Selected?
Yes
No
ASAC Flight Segment Cost Model - Mission Generator Depart Operations File Locator
mglookup.cgi
Find
Upload
ASAC Flight Segment Cost Model - Mission Generator Depart Operations File Finder
Select Depart Operations File and Continue
mglookup.cgi
Standard File Upload
FTP
HTTP
Takeoff Delay Selected
Yes
No
ASAC Flight Segment Cost Model - Mission Generator Takeoff Delay File Locator
mglookup.cgi
Find
Upload
ASAC Flight Segment Cost Model - Mission Generator Takeoff Delay File Finder
Select Takeoff Delay File and Continue
mglookup.cgi
Standard File Upload
FTP
HTTP
Takeoff Operations Selected?
Yes
No
ASAC Flight Segment Cost Model - Mission Generator Takeoff Operations File Locator
mglookup.cgi
Find
Upload
ASAC Flight Segment Cost Model - Mission Generator Takeoff Operations File Finder
Select Takeoff Operations File and Continue
mglookup.cgi
Standard File Upload
FTP
HTTP
Taxi In Delay Selected?
No
ASAC Flight Segment Cost Model - Mission Generator Taxi In Delay File Locator
mglookup.cgi
Find
Upload
ASAC Flight Segment Cost Model - Mission Generator Taxi In Delay File Finder
Select Taxi In Delay File and Continue
mglookup.cgi
Standard File Upload
FTP
HTTP
I

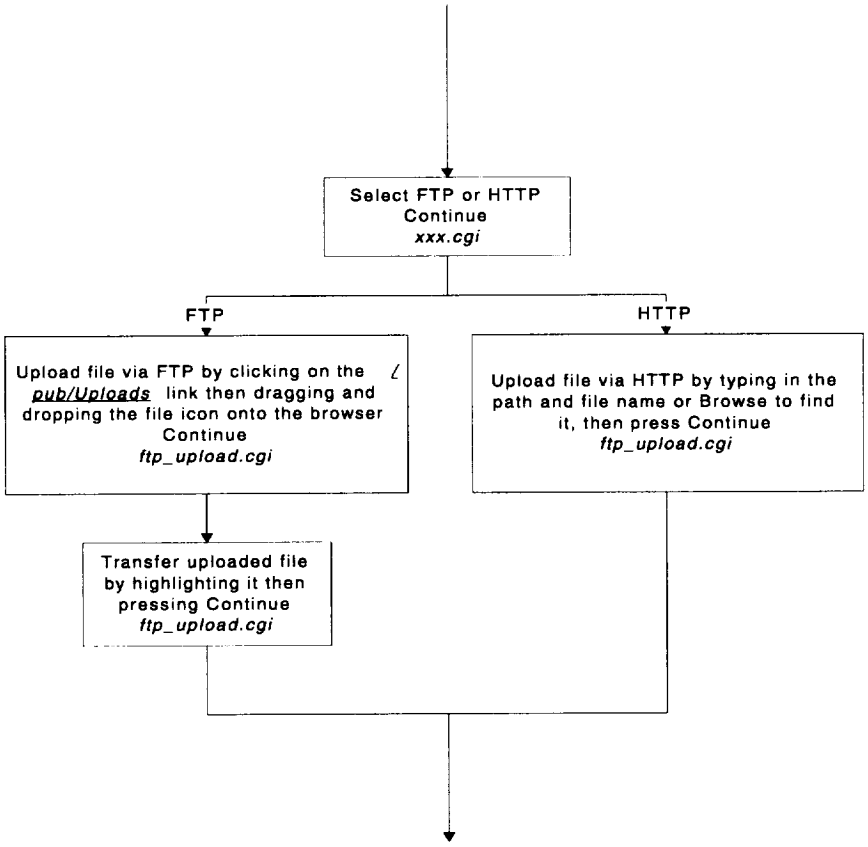

1
Taxi In Operations Selected?
Yes
No
ASAC Flight Segment Cost Model - Mission Generator Taxi In Operations File Locator
mglookup.cgi
Find
Upload
ASAC Flight Segment Cost Model - Mission Generator Taxi In Operations File Finder
Select Taxi In Operations File and Continue
mglookup.cgi
Standard File Upload
FTP
HTTP
Taxi Out Delay Selected?
Yes
No
ASAC Flight Segment Cost Model - Mission Generator Taxi Out Delay File Locator
mglookup.cgi
Find
Upload
ASAC Flight Segment Cost Model - Mission Generator Taxi Out Delay File Finder
Select Taxi Out Delay File and Continue
mglookup.cgi
Standard File Upload
FTP
HTTP
Optimizer Values Selected?
Yes
No
ASAC Flight Segment Cost Model - Mission Generator Scenario File Customizer
Enter Optimizer Values and Continue
mgcustsf2.cgi
Weather Sampling Selected?
Yes
No
ASAC Flight Segment Cost Model - Mission Generator Scenario File Customizer
Enter Weather Sampling Parameters
mgcustsf2.cgi
Continue
Change File
ASAC Flight Segment Cost Model - Mission Generator Weather Histogram File Locator
mgcustsfwx.cgi
Find
Upload
ASAC Flight Segment Cost Model - Mission Generator Weather Histogram File Finder
Select Weather Histogram File and Continue
mgcustsfwx.cgi
Standard File Upload
FTP
HTTP
Run the ASAC Flight Segment Cost Model - Mission Generator
Enter Output File Name
mgenv.cgi
ASAC Flight Segment Cost Model - Mission Generator Results
Download file: file.nrf
mgrun.cgi
OPTIONAL -
Download Model Results and Save In Text Format With .nrf File Extension.
file.nrf -- Network Resource File

ASAC Flight Segment Cost Model - Cost Translator

http://www.asac.lmi.org/access/model-wizard/cthome.shtml



Standard File Upload



Appendix C
QRS Report Server Reports

This a table of all QRS reports, sorted by report category, that includes the report name, report title, and last revision date for the report.

Table C-1. QRS Server Reports Sorted by Report Category

Category name	Report name	Report title	Date of last revision
Airport data	ASQP-AR1	ASQP Departure and Arrival Delays (ranked by total of departure and arrival delay)	10/31/96
Airport data	ASQP-AR2	ASQP Departure and Arrival Delays (ranked by average departure delay)	10/29/96
Airport data	ASQP-AR3	ASQP Departure and Arrival Delays (ranked by average arrival delay)	10/31/96
Airport data	ASQP-RAT	ASQP and T-3 Ratios and Scaling Factors (sorted by airport code)	10/24/96
Airport data	OAG-AIR3	OAG Airport Statistics (ranked by OAG departures)	7/10/96
Airport data	OAG-AIR4	OAG Airport Statistics (ranked by revenue passenger miles)	7/10/96
Airport data	OAG-AIR5	OAG Airport Statistics (ranked by number of passengers)	7/10/96
Airport data	OAG-AP1	OAG Airport Departures—equipment level (sorted by aircraft type)	7/18/96
Airport data	OAG-AP2	OAG Airport Departures—carrier level (sorted by carrier name)	8/2/96
Airport data	OAG-AP3	ASAC Airport Departures Forecast—equipment level (sorted by aircraft type)	10/25/96
Airport data	OAG-TMDC	OAG Daily Departures and Arrivals—specific carrier statistically average day for a specific day of the week	5/30/96
Airport data	OAG-TMDE	OAG Daily Departures and Arrivals—specific equipment statistically average day for a specific day of the week	5/30/96
Airport data	OAG-TMDG	OAG daily departures and arrivals statistically average day for a specific day of the week	5/30/96
Airport data	OAG-TMMC	OAG Daily Departures and Arrivals—specific carrier statistically average day for a specific month	5/30/96
Airport data	OAG-TMME	OAG Daily Departures and Arrivals—specific equipment statistically average day for a specific month	5/30/96
Airport data	OAG-TMMG	OAG daily departures and arrivals statistically average day for a specific month	5/30/96

Table C-1. QRS Server Reports Sorted by Report Category (Continued)

Category name	Report name	Report title	Date of last revision
Airport data	OAG-TMYC	OAG Daily Departures and Arrivals—specific carrier statistically average day for 1993	5/30/96
Airport data	OAG-TMYE	OAG Daily Departures and Arrivals—specific equipment statistically average day for 1993	5/30/96
Airport data	OAG-TMYG	OAG Daily Departures and Arrivals Statistically Average Day for 1993	5/30/96
Airport data	RNK-DEP	DOT Airport Statistics (ranked by T-3 scheduled departures)	2/29/96
Airport data	RNK-ENP	DOT Airport Statistics (ranked by T-3 enplaned passengers)	2/29/96
Airport data	RNK-RPM	DOT Airport Statistics (ranked by T-100 revenue passenger miles)	2/29/96
Airport data	TAF-1	TAF Operations—one airport for all years (sorted by year)	10/25/96
Airport data	TAF-2	TAF Operations—all airports for one year (ranked by total operations)	10/25/96
Airport data	TAF-3	TAF Airport Data (ranked by practical annual capacity)	10/25/96
Carrier data	AI3	Aircraft Inventory by Carrier (ranked by inventory count)	4/16/96
Carrier data	AI4	Aircraft Inventory for a Specific Carrier (ranked by inventory count)	5/30/96
Carrier data	B43-CA1	B-43 Aircraft Inventory—distribution of aircraft (for a given carrier)	10/28/96
Carrier data	BS1	Air Carrier Balance Sheet Information (ranked by net stockholders' equity)	2/29/96
Carrier data	DFSD-CA1	Flight Segment Means & Standard Deviations—carrier level (ranked by stage length)	2/29/96
Carrier data	DOR-CAR	Direct Operating Cost Ratios—carrier level (sorted by carrier name)	2/29/96
Carrier data	G1OC	Air Carrier Group 1 Operating Costs (sorted by carrier name)	4/17/96
Carrier data	G23OC	Air Carrier Group 2 and 3 Operating Costs (sorted by carrier name)	4/17/96
Carrier data	OAG-CA1	OAG Carrier Level Data—passenger aircraft (sorted by carrier name)	2/29/96
Carrier data	OAG-CA2	OAG Carrier Level Data—cargo aircraft (sorted by carrier name)	2/29/96
Carrier data	OAG-CA3	Equipment-Specific Operational Data for a Given Carrier (ranked by revenue passenger miles)	5/7/96
Carrier data	OAG-CA4	Airport-Specific Operational Data for a Given Carrier (ranked by revenue passenger miles)	7/18/96
Carrier data	OPRATCR1	Air Carrier Operating Ratios—scheduled airlines (sorted by carrier name)	2/29/96
Carrier data	OPRATCR2	Air Carrier operating ratios—other airlines (sorted by carrier name)	2/29/96

Table C-1. QRS Server Reports Sorted by Report Category (Continued)

Category name	Report name	Report title	Date of last revision
Carrier data	PL	Air Carrier Profit and Loss Information (sorted by carrier name)	4/17/96
Carrier data	PM1-CAR	Productivity Measures—carrier level (sorted by carrier name)	4/17/96
Carrier data	PROFRAT	Air Carrier Profitability Ratios (sorted by carrier name)	2/29/96
Carrier data	RAI-CA1	Regional Aircraft Inventory—carrier aircraft summary (sorted by carrier)	11/24/97
Carrier data	RAI-CA2	Regional Aircraft Inventory—carrier passenger aircraft summary (sorted by model)	11/24/97
Carrier data	RAI-CA3	Regional Aircraft Inventory—cargo aircraft report (sorted by model)	11/24/97
Equipment data	AI1	Aircraft Inventory by Model (ranked by inventory count)	4/16/96
Equipment data	AI2	Aircraft Inventory for a Specific Model (ranked by inventory count)	4/16/96
Equipment data	AI9	Aircraft Inventory for a Specific Model by Airline (ranked by inventory count)	5/29/96
Equipment data	B43-EQ1	B43 Aircraft Inventory—distribution of carriers (for a given equipment code)	10/28/96
Equipment data	COD-EQ1	Cost and Operational Data—equipment level (sorted by aircraft type, model name)	7/12/96
Equipment data	DFSD-EQ1	Flight Segment Means and Standard Deviations—equipment level (ranked by stage length)	2/29/96
Equipment data	DOR-EQ	Direct Operating Cost Ratios—equipment level (sorted by model name)	2/29/96
Equipment data	OAG-EQ1	OAG Equipment Level Data—passenger aircraft (sorted by model name)	7/10/96
Equipment data	OAG-EQ2	OAG Equipment Level Data—cargo aircraft (sorted by model name)	10/22/96
Equipment data	PM1-EQ	Productivity Measures—equipment level (sorted by model name)	2/29/96
Flight segment data	ASQP-PA1	ASQP Flight Delays by Flight Segment (ranked by total flight delay minutes)	10/31/96
Flight segment data	DFSD-FS1	DOT Flight Segment Data—equipment level (sorted by model name)	2/29/96
Flight segment data	DFSD-FS2	DOT Flight Segment Data—carrier level (sorted by carrier name)	2/29/96
Flight segment data	DFSD-NUM	T-100 Top Flight Segments (ranked by flight count)	2/29/96
Flight segment data	DFSD-ONB	T-100 Top Flight Segments (ranked by number of passengers)	2/29/96
Flight segment data	DFSD-RPM	T-100 Top Flight Segments (ranked by revenue passenger miles)	2/29/96
Flight segment data	OAG-FS1	OAG Flight Segment Data—equipment level (ranked by revenue passenger miles)	7/10/96

Table C-1. QRS Server Reports Sorted by Report Category (Continued)

Category name	Report name	Report title	Date of last revision
Flight segment data	OAG-FS2	OAG Flight Segment Data—carrier level (ranked by revenue passenger miles)	6/27/96
Flight segment data	OAG-FS3	OAG Top Flight Segments (ranked by flight count)	7/10/96
Flight segment data	OAG-FS4	OAG Top Flight Segments (ranked by revenue passenger miles)	7/10/96
Flight segment data	OAG-FS5	OAG Top Flight Segments (ranked by number of passengers)	7/10/96
High altitude wind data	HAWD2	High Altitude Wind Data—select by date	8/8/97
High altitude wind data	HAWD1	High Altitude Wind Data—select by location	8/8/97
Jet engine data	AI5	Jet Engine Inventory (ranked by engine count)	4/16/96
Jet engine data	AI6	Jet Engine Inventory by Manufacturer (ranked by engine count)	4/16/96
Jet engine data	AI7	Distribution of Aircraft Powered by a Specific Engine (ranked by engine count)	4/16/96
Jet engine data	AI8	Distribution of Engines Mounted on a Specific Model (sorted by model and series)	4/16/96
Miscellaneous	ARLNCOD1	Carrier Codes and Names (sorted by carrier name)	2/29/96
Miscellaneous	ARLNCOD2	Carrier Codes and Names (sorted by carrier code)	2/29/96
Miscellaneous	DOT-COD1	DOT Codes and Place Names (sorted by place name)	2/29/96
Miscellaneous	OAG-COD1	OAG Codes and Place Names (sorted by place name)	2/29/96
Miscellaneous	TAF-COD1	TAF Codes and Place Names (sorted by place name)	10/25/96
Origin and destination data	OD-AP1	Origin and Destination—airport totals (ranked by ratio of inbound to outbound initiated trips)	10/18/96
Origin and destination data	OD-AP2	Origin and Destination—airport totals (ranked by O&D matrix enplaned passengers)	2/29/96
Origin and destination data	OD-AP3	Origin and Destination—airport totals (ranked by ratio of O&D to T-3)	2/29/96
Origin and destination data	OD-AP4	Origin and Destination—airport totals (ranked by sum of inbound and outbound international passengers)	2/29/96
Origin and destination data	OD-AP5	Origin and Destination—airport totals (ranked by outbound domestic passenger revenues)	4/23/96
Origin and destination data	OD-CT1	Origin and Destination—city totals (ranked by ratio of inbound to outbound initiated trips)	11/14/96
Origin and destination data	OD-CT2	Origin and Destination—city totals (ranked by O&D matrix enplaned passengers)	11/18/96
Origin and destination data	OD-CT3	Origin and Destination—city totals (ranked by ratio of O&D to T-3)	11/18/96
Origin and destination data	OD-CT4	Origin and Destination—city totals (ranked by sum of inbound and outbound international passengers)	11/18/96

Table C-1. QRS Server Reports Sorted by Report Category (Continued)

Category name	Report name	Report title	Date of last revision
Origin and destination data	OD-CT5	Origin and Destination—city totals (ranked by outbound domestic passenger revenues)	11/18/96
Origin and destination data	ODFS-ACU	Origin and Destination—airport pairs (ranked by average coupons used)	2/29/96
Origin and destination data	ODFS-AF	Origin and Destination—airport pairs (ranked by average fare)	2/29/96
Origin and destination data	ODFS-CF	Origin and Destination—airport pairs (ranked by circuity factor)	2/29/96
Origin and destination data	ODFS-DOM	Origin and Destination—airport pairs (ranked by domestic passenger count)	2/29/96
Origin and destination data	ODFS-PZA	Origin and Destination—airport pairs (ranked by percent of zero fare passengers ascending)	2/29/96
Origin and destination data	ODFS-PZD	Origin and Destination—airport pairs (ranked by percent of zero fare passengers descending)	2/29/96
Origin and destination data	ODFS-REV	Origin and Destination—airport pairs (ranked by domestic passenger revenues)	2/29/96
Origin and destination data	ODFS-TY	Origin and Destination—airport pairs (ranked by traditional yield)	2/29/96

Appendix D
QRS Problem Reports

Eighteen QRS problem reports (PRs) were unresolved after initial QRS testing. Thirty-two additional QRS PRs were written during FY97. Of these reports, all but twenty-four are still being worked. PRs remaining after the initial QRS testing, plus PRs that were written in FY97, and their status are described in Table D-1.

Table D-1. QRS Problem Report Description and Status

PR Number	Problem Description	Status
From initial QRS testing		
94	Select Enter ASAC QRS link and cancel, receive generic message "...browser not auth. capable or auth. failed." This could be confusing to the user. Should go to a page that is more explanatory.	Future
147	This is a general comment based on I think that we need to have the capability to create sub-divisions of various reports based upon regions or even countries of the world.	Future
187	Create New Report for ASAC functionality OD-3.3: Most heavily travelled city pairs ranked by # of passengers	Future
188	Create New Report for ASAC functionality OD-3.4: Most heavily travelled city pairs by revenues	Future
189	Create New Report for ASAC functionality OD-4.2x(additional capability): Most heavily travelled city pairs sorted by (i) circuity factor, (ii) traditional yield, (iii) zero fare passengers ascending, (iv) zero fare passengers descending, (v)average fare	Closed
190	ASAC Functionality TAF-2 requires that we provide a list of identifiers of all airports satisfying specified criteria. The report TAF-2 does provide a list, but doesn't give the user the ability to specify a criteria for selectiing the airport. (Report ID	Future
202	Data source descriptions and key term definitions need to be synched with appendices in User's Manual.	Opened
210	Document the process of data transfer from the PC to the UNIX server. Include all post-processing that is done to the data on UNIX.	Working
211	Origin and Destination data for 1990 to 1994 have been revised. Upon receipt of the 1995 CD, we will have to repull and reprocess the prior years' data.	Future
213	Add a document server to ASAC. Will contain LMI ASAC related reports.	Resolved

Table D-1. QRS Problem Report Description and Status (Continued)

PR Number	Problem Description	Status
220	Fix OAG-AP3 so it uses the table AIRPORT in the QRS database to cross-reference between OAG and TAF airport codes. (Report ID: OAG-AP3)	New
229	In the Query Server, the function called Airport Rundown should list total operations (sum of the six types of ops) as a time series, rather than the current two columns of enplanements.	Future
235	Source code for SQL in report specification is not well documented or organized. Needs extensive commentary and useful table and variable names, as well as clearer formatting. (Report ID: OAG-AP3)	New
243	In the variable definitions, for air carrier enplanements we should delete the word "scheduled" between "on" and "flights" in the first sentence. The definition for supplemental enplanements should be deleted. In the definition of total enplanements, we should delete the reference to supplemental enplanements.	Closed
255	Not all recently added definitions (e.g. taxi-out time, taxi-in time, etc.) are available at access/help/AppendixB.htm. Please point all definition links to most comprehensive and up-to-date file.	Closed
256	B43 data source writeup does not show up at access/ help/AppendixA/htm. Please point all data source links to most comprehensive and up-to-date file.	Closed
258	Please move definition listed under "Stage 2" to a more general "Noise Stage" listing and then delete "Stage 2" from definitions of key terms. Report variables Stage 2 and Stage 3 should be pointed to the "Noise Stage" definition.	Closed
259	Please update methodology write-up. I'll leave a marked-up copy with Jim.	Closed
New for FY97		
263	Create New Report for ASAC functionality OD-4.2x(additional capability): Most heavily traveled city pairs sorted by circuity factor	Future
264	Create New Report for ASAC functionality OD-4.2x(additional capability): Most heavily traveled city pairs sorted by traditional yield	Future
265	Create New Report for ASAC functionality OD-4.2x(additional capability): Most heavily traveled city pairs sorted by zero fare passengers ascending	Future
266	Create New Report for ASAC functionality OD-4.2x(additional capability): Most heavily traveled city pairs sorted by zero fare passengers descending	Future
267	Create New Report for ASAC functionality OD-4.2x(additional capability): Most heavily traveled city pairs sorted by average fare	Future

Table D-1. QRS Problem Report Description and Status (Continued)

PR Number	Problem Description	Status
268	Until the User Manual sync PR is complete, suggest changing the link to Data Source Descriptions from/access/help/AppendixA.htm to/access/datadesc.html. The descriptions under AppendixA do not contain the most current data (or any B-43 description). The user can currently get to datadesc by following data source links from individual report pages.	Duplicate
269	Add definitions for Unknown Ownership and Unknown Noise Stage	Closed
270	newusrapp.shtml contains a bad link to Report Server Home Page at bottom. Should go back to the QRS Welcome Page (qrswelcome.html)	Closed
271	Add a link to Web-ACSYNT to the ASAC Related Web Sites Page. URL is http://fornax.arc.nasa.gov:9999/asac.html	Resolved
272	The listing of report variable definitions is extremely hard to read. I prefer the old method of an alphabet that links to the appropriate sections.	Rejected
273	For AOG Carrier Code "PR," the correct name of the air carrier is Philippine (one L) Airlines.	Resolved
274	Noise Certification Data: Need to reverse the column headings for takeoff and landing weights. I've downloaded the.xls file which definitely has the above error. Make sure that all of the files are checked to see if they need to be corrected.	Resolved
275	Add the ability to 'become a member' to the ASAC Executive Assistant.	Closed
276	Add the reports for FY96 ASAC work to the ASAC document server.	New
277	Add Boeing Current Market Outlook http://www.boeing.com/cmo to the aviation related sites.	Duplicate
278	The inbound and outbound initiated trip data elements appear to be reversed in the 1994 data. Note how the order flips when comparing 1993 (which is right) to 1994.	Closed
279	For the Query Server, please add note to the Carrier Code function about using "_" to connect words, e.g. United_Airlines.	Opened
280	1993 T-100 flight segment data appear to be missing. Partial for departures out of SJC and completely for departures out of STL and SYR.	Closed
281	Link to Commercial Aviation Resource Center is out of date. New address is http://airlines-online.com	Resolved
282	Pages to request FTNIM (/access/ftnim.html and access/ftnimreq.shtml) are out of date. Windows NT version of model will run via WWW. There is no stand-alone Windows NT FTNIM currently available.	Resolved
283	Blank	—

Table D-1. QRS Problem Report Description and Status (Continued)

PR Number	Problem Description	Status
284	For B43-CA1 and B43-EQ1 reports, the column header/report variable "Total Aircraft" needs a definition. I recommend "The number of aircraft of a specified model and series listed in the B-43 Airframe Inventory (hypertext link)". Also, the source listed for both reports should be "1994 B43 Airframe Inventory Data". Finally, I assume the "1994" will go away globally once the 1995 B43 data are added.	Closed
285	For aircraft model A340: The DOT_model and number of engines is not correct. When I used "Jane's to look up num_eng, it listed it as" "4. Our database lists it as 2, with DOT_model" "= 697 in three cases, and 873 in one other" case. The 1994 DOT directive also lists is as DOT_code=697 and num_eng=2. I sent an e-mail to Jeff Gorham at DOT. He verified that they updated their database in 1996 to coincide with Jane's to reflect the A340 with 4 engines and gave it a new code of 873. I have requested a copy of the 1996 database in order to check for any other changes/ inconstancies.	Resolved
286	In B43-CA1 and B43-EQ1, change the report name and source from B43 to B-43 to be consistent with DOT and other references in the QRS.	Resolved
287	All email addresses referencing spock.lmi.org need to be changed to reference asac.lmi.org.	Closed
288	Need source description for high altitude wind data added to source description document.	New
289	High altitude wind reports need to have source reflect change made for PR 288 (Report ID:HAWD1-2).	New
290	Regional aircraft inventory needs description for data source documentation page.	Closed
291	FTNIM request form needs field validation to be sure that all fields are filled out (ftnimreq.shtml).	New
292	"JavaScript Error://www.asac.lmi.org/access/rserver.html, line 105 syntax error <HR><H3>Transfer interrupted!</H37." Problem appears when using Netscape 4.	New
293	1995 B-43 data. Source description says 1994 data only. No year selection available on reports.	New
294	DOT Form 41 Reports needs 1995 added as variable to select.	New
295	High altitude wind data reports. Select by location report needs wider date field. Source description needs improvement and a hypertext link.	New

Appendix E
Abbreviations

ANSI	American National Standard Institute
ASAC	Aviation System Analysis Capability
ASQP	Airline Service Quality Performance
AST	Advanced Subsonic Technology
CD-ROM	compact disk–read-only memory
COTS	commercial off-the-shelf
CSU/DSU	Channel Service Unit/Data Service Unit
DOT	U.S. Department of Transportation
FAA	Federal Aviation Administration
FTP	File Transfer Protocol
FY	Fiscal Year
GB	gigabyte
GUI	Graphical User Interface
HP	Hewlett-Packard
HTTP	Hypertext Transfer Protocol
ICAO	International Civil Aviation Organization
ID	identification
LAN	Local Area Network
LMI	Logistics Management Institute
MB	megabyte
Mbps	megabits per second
NASA	National Aeronautics and Space Administration
OAG	Official Airlines Guides
OSF	Open Software Foundation
PR	problem report
QRS	Quick Response System
RAM	Random Access Memory

RDBMS	Relational Database Management System
RISC	Reduced Instruction Set Computer
SCSI	Small Computer Systems Interface
SQL	Standard Query Language
TAF	Terminal Area Forecast
TCA	Total Coverage Analysis
TCP/IP	Transmission Control Protocol/Internet Protocol
UPS	uninterruptable power supply
WAN	Wide Area Network
WWW	World Wide Web

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1. AGENCY USE ONLY (*Leave blank*)	2. REPORT DATE	3. REPORT TYPE AND DATES COVERED
	April 1998	Contractor Report

4. TITLE AND SUBTITLE
Aviation System Analysis Capability Quick Response System Report for Fiscal Year 1997

5. FUNDING NUMBERS
C NAS2-14361

WU 538-04-14-02

6. AUTHOR(S)
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7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
Logisitics Management Institute
2000 Corporation Ridge
McLean, Virginia 22102-7805

8. PERFORMING ORGANIZATION REPORT NUMBER
NS701S2

9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES)
National Aeronautics and Space Administration
Langley Research Center
Hampton, VA 23681-0001

10. SPONSORING / MONITORING AGENCY REPORT NUMBER
NASA/CR-1998-207663

11. SUPPLEMENTARY NOTES
Langley Technical Monitor: Robert E. Yackovetsky
Final Report

12a. DISTRIBUTION / AVAILABILITY STATEMENT
Unclassified - Unlimited

Subject Category 01

Distribution: Nonstandard

Availability: CASI (301) 621-0390

12b. DISTRIBUTION CODE

13. ABSTRACT (*Maximum 200 words*)
The purpose of this document is to present the additions and modifications made to the Aviation System Analysis Capability (ASAC) Quick Response System (QRS) in FY 1997 in support of the ASAC QRS development effort. This document contains an overview of the project background and scope and defines the QRS. The document also presents an overview of the Logistics Management Institute (LMI) facility that supports the QRS, and it includes a summary of the planned additions to the QRS in FY 1998. The document has five appendices.

14. SUBJECT TERMS
ASAC
Quick Response System (QRS)
databases

15. NUMBER OF PAGES
101

16. PRICE CODE
A05

17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT
Unclassified	Unclassified	Unclassified	Unlimited